

235 378  
*Museum Rusticum et Commerciale :*

O R,

SELECT PAPERS

O N

AGRICULTURE, || ARTS, AND  
COMMERCE, || MANUFACTURES.

DRAWN FROM EXPERIENCE,

A N D

Communicated by GENTLEMEN engaged in  
these Pursuits.

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Revised and Digested by several MEMBERS of the SOCIETY for the  
Encouragement of ARTS, MANUFACTURES, and COMMERCE.

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VOLUME THE SIXTH.

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*Hæ tibi erunt Artes.*

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L O N D O N :

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M DCC LXVI.





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# C O N T E N T S.

## N U M B E R I.

**C**ONTINUATION of the Account of the Culture of the Teasel; in a Letter to the Editors of the Museum Rusticum, from Ruricola Glocestria Page 1

## N U M B E R II.

Account of the Cure of Worms in Horses, by the Use of Sea-Salt, Sal-Prunellæ, or Salt-Petre 7

## N U M B E R III.

Description of, and Observations on some proposed Improvements on the Cutting-Box for Hay and Straw, in a Letter from Mr. Crockatt to Mr. Comber; and an Answer from Mr. Comber to him 8

## N U M B E R IV.

Observations on the Causes of the present high Price of Corn, and the Expedience of continuing the Bounty; in a Letter to the Editors 16

## N U M B E R V.

Further Remarks on the several Kinds of Burnet, and its Use in feeding Cattle and Sheep, in a Letter from Mago to the Editors 26

## N U M B E R VI.

Answer to the Queries, in a Letter from Mechanicus, inserted in No. 26. Vol. V. relating to the Management of his Farm, and the Manner of his laying down some Land in Grass 33

## C O N T E N T S.

### N U M B E R VII.

*Account of an Experiment to prove that Kine are fond of Burnet :  
And of an Improvement of the Method of making Bundles of  
Hay to be carried to Cattle* Page 35

### N U M B E R VIII.

*Method of Propagation and Culture of the Scotch Fir, Spruce  
Fir, and Larch.* 41

### N U M B E R IX.

*Account of the Nature, Culture and Use of the Turnep-Cabbage ;  
explaining the Reasons for the Premium offered by the Society  
for the Encouragement of Arts for that Article : In a Letter  
from Agricola* 46.

### N U M B E R X.

*Two Premiums offered by the Society for the Encouragement of  
Arts, &c. the one for a Machine for slicing Turneps ; the  
other, for cultivating the Turnep-cabbage* 56

### N U M B E R XI.

*Process for making Pot-ash, communicated by Mr. Dossie, to  
the Society for the Encouragement of Arts, &c. With Ob-  
servations tending to illustrate the Question, Whether the  
same could not be practised in Great-Britain with Advantage ?  
In a Letter from him to the Editors* 57

### N U M B E R XII.

*Observations on the present Neglect of planting Trees : And  
on the Advantages and Means of Culture of the Norfolk-  
Willow ; and other quick-growing Trees* 73

### N U M B E R XIII.

*Account of a peculiar Method of Tillage, at a Place in the East-  
Riding of Yorkshire : and an Examination of the Proofs  
advanced to shew the fatal Effects of Ground-Ivy, when eaten  
by Horses* 83

N U M-



## C O N T E N T S.

### N U M B E R XIV.

*Observations on the Practicability and Means of producing Silk in England with Profit: in a Letter from Agricola* Page 89

### N U M B E R XV.

*Answer to Mechanicus's Queries concerning the Management of his Farm; and Reflections on the Expedience and Means of improving public Roads, particularly those which are not turnpike: In two Letters to the Editors from Mago* 102

### N U M B E R XVI.

*Queries relating to the Society's Premium for a Machine for slicing Turneps: And an Account of the Success of an Experiment, on a new Method, of making Hogs grow quickly fat: In a Letter from Mechanicus to the Editors* 114

### N U M B E R XVII.

*An Account of the Nature, Culture, and Uses of Bird-grass, with some Observations on the Utility of Burnet, Lucern, Timothy-grass, and Poa-grass; and some Hints for the Improvement of Ploughs, communicated to the Society for promoting Arts, &c. by Mr. Rocque* 118

### N U M B E R XVIII.

*Further Reflections on inclosing of Commons, and engrassing of Farms* 130

### N U M B E R XIX.

*Account of an Experiment made on Hogs, by the Use of Sea-Water, under some particular Circumstances* 146

### N U M B E R XX.

*Observations on the Advantages, and an explicit Account of the best Methods, of draining the several Kinds of Marshy and Moory Lands* 149

N U M-

## N U M B E R XXI.

*Two Letters on the Question, Whether the Culture of Burnet be advantageous? Sent in Consequence of a Desire, express'd in one of Mago's Letters formerly published* Page 157

## N U M B E R XXII.

*Observations on the public Advantages of selling Corn by Weight, instead of Measure* 160

## N U M B E R XXIII.

*Remarks on the Premium, offered by the London Society, for a Machine for slicing Turneps; and Agricola's Letter on that Subject, published in Number 27* 163

## N U M B E R XXIV.

*Remarks on the Benefit, which would arise from the completing the Catalogue of English Weeds, published in Number 25: With Observations on certain Kinds: And on the Advantages of rendering general, through the Channel of the Museum Rusticum, useful Matters, that may be before known in some particular Places only* 166

## N U M B E R XXV.

*An Account of the comparative Advantages of cultivating Lucern, on the drill or broad-cast Methods; for which the Society for promoting Arts, &c. adjudged their Premium of a Gold Medal* 170

## N U M B E R XXVI.

*An Account of the Nature, Propagation, Uses, and very great Advantages of the Italian or Lombardy Poplar* 175

## N U M B E R XXVII.

*Directions for preparing domestic Wines, equal to, and resembling the best foreign;—for making a cheap and wholesome extemporaneous Kind of Small Beer from Melasses;—and for improving the British Imitation of Rum. With Observations on the private and public Utility of making domestic Wines, &c.*

# C O N T E N T S.

vii

## N U M B E R XXVIII.

*Descriptions of those of the Weeds, enumerated in Vol. V. page 301, that are annual, and not universally known. In a second Letter from P. B. C. on that Subject*      Page 194

## N U M B E R XXIX.

*An Account of a newly-discovered Method of destroying Insects, that devour the Leaves and injure the young Shoots of Fruit Trees, by medicating the Trees with Quicksilver; communicated to the Society for promoting Arts, &c. With Observations on the same, in a Letter from Agricola to the Editors*      199

## N U M B E R XXX.

*Further Considerations on the Effects of the Bounty on the Exportation of Corn; being an Answer to some Particulars in E. S.'s Letter in Number 28. Vol. VI.*      212

## N U M B E R XXXI.

*A Letter from Mechanicus, relating to Mago's Instructions for the Management of his Farm; with some Observations on the Nature of Marl*      214

## N U M B E R XXXII.

*Some Observations on the Premiums offered by the Society, for a Machine for slicing Turneps; on the Nature, Culture, and Uses, of Turnep Cabbage, and on the Advantages of the Drill-culture. In a Letter from Mr. Wynne Baker to the Editors*      220

## N U M B E R XXXIII.

*Considerations on the Advantages, that might accrue, from the Establishment of County Societies for the Encouragement of Agriculture; and some Hints for the Regulations of such Societies*      229

## N U M B E R XXXIV.

*An Account of an Improvement in the Method of ploughing Ground, by Means of a Plough of a new Construction (here described)*      by



*by which much greater Crops may be obtained, without any additional Expence or Labour, than by the Use of the common Plough; with Observations on the Effects of frequently repeated Stirrings of the Soil; and the comparative Benefits of that, and laying on Dung*

Page 235

#### N U M B E R XXXV.

*An Account of the State of a Piece of Ground cultivated with Burnet; and its Effect in feeding Cattle and Horses: In a Letter from the Kentishman*

240

#### N U M B E R XXXVI.

*Further Considerations on the Practicability of producing Silk in England, with Advantage to the Undertakers: And on the Means by which that most valuable Article may be introduced: In a Letter from Agricola*

241

#### N U M B E R XXXVII.

*Inquiry relative to Dr. Hales's Machine for winnowing Corn*

255

#### N U M B E R XXXVIII.

*Observations on the Culture of Burnet, and its Utility in feeding neat Cattle, Horses, and Sheep, demonstrated from Facts: In a Letter from Christopher Baldwin, Esq; to Dr. Templeman, Secretary of the Society for promoting Arts, &c. Published at the Desire of the Society*

258

#### N U M B E R XXXIX.

*Observations on a common Error, or Collusion, practised with respect to the Form of Measures, by which Corn, Coals, &c. are sold, to the Detriment of the retail Purchasers of those Commodities; with a Proposal for preventing it, by providing a just Standard of Regulations, proper to be enforced, as to the relative Dimensions of the Diameter and Depth of such Measures*

264

#### N U M B E R XL.

*A Letter from Mr. Wynne Baker, respecting some Inquiries relative to Rape-feed, Cole-feed, and Millet; and a Proposal for*

for

# C O N T E N T S. ix

*for establishing a general Correspondence betwixt the several Societies for promoting Agriculture, for the transmitting to each other useful and rare Seeds and Plants* Page 268

## N U M B E R XLI.

*Some Observations on the Point of View to which the Editors have reduced their Inquiry into the Reason of the Liking or Disgust which Cattle shew to Burnet: with an Account of an Experiment relative to the same: and some Reflexions on the Mischief done by Labourers carrying up Ladders Materials for Building, and a Proposal for applying an adequate Remedy* 274

## N U M B E R XLII.

*A comparative Calculation of Expence and Profit between the Drill and the Common Husbandry, taken from Mr. Baker's Report to the Dublin Society of his Experiments in Agriculture, for the Year 1765. Published by Order of the Society* 280

## N U M B E R XLIII.

*Further Considerations on the planting quick-growing Trees: with some particular Observations on the Carolina Poplar and Transylvanian Hazel: In a Letter from Philoſylva* 287

## N U M B E R XLIV.

*Some further Instructions and Observations relative to the making Pot-ash, intended for the Use of the Colonies: In a second Letter from Mr. Doffie* 295

## N U M B E R XLV.

*An Account of the Strawberry or Hop-Trefoil; in Answer to a former Inquiry relative to it. In a Letter from Mechanicus* 302

## N U M B E R XLVI.

*A Proposal for attempting the Production of Silk, according to Agricola's Plan, if proper Assistance, as promised by him, be given* 304

## N U M B E R XLVII.

*An Account of the extraordinary Size of neat Cattle and Sheep in Tees Vale, and the Neighbourhood of Yarm* Page 305

## N U M B E R XLVIII.

*Observations of the Advantages of Peat-Ashes, in dressing Land, and the Manner of preparing and using them* 308

## N U M B E R XLIX.

*Observations on the Profits of grazing or feeding Cattle; tending to show, the little Advantages accruing therefrom, under the present Circumstances: And exemplified by a particular Account, and Estimate of the Expences, and Return, of feeding horned Cattle, with Oil-Cakes* 312

## N U M B E R L.

*Observations on the Injury done to Grass-Land by Ants, or Pismires; and on the Means of destroying them* 315

## N U M B E R LI.

*An Account of the Nature, and Use of the Nonsuch or Hop Trefoil; and of the Manner in which it is cultivated in Suffex* 332

## N U M B E R LII.

*A List of the Premiums offered for the Year 1766, by the Society for the Encouragement of Arts, Manufactures, and Commerce* 339

## N U M B E R LIII.

*Observations on the Structure and Manner of Use of the Spiky Roller, by Mr. Randall* 371

## N U M B E R LIV.

*Observations on the Importance of planting quick-growing Trees; and on the Nature and Use of several particular Kinds* 376

N U M-



# C O N T E N T S.

xi

## N U M B E R L V.

*An Inquiry relative to the Culture, &c. of Hemp : In a Letter from Mechanicus.* Page 381

## N U M B E R L V I.

*Observations on the Cultivation and Use of Lucern in Picardy* 385

## N U M B E R L V I I.

*Account of the best Manner of cultivating and preparing Indigo in Carolina : And of the Manner of cultivating of Indigo, Cotton, and Tobacco on the same Land in China* 387

## N U M B E R L V I I I.

*Account of the Construction and Use of two Horse-hoes, or Hoe-ploughs, laid before the Society for the Encouragement of Arts, &c. by the Inventor, W. Hewitt* 397

## N U M B E R L I X.

*Observations on the Structure, Use, and Expence, of public Granaries ; in order to demonstrate the Impracticability of erecting them in Great Britain ; and the consequential Expedience of continuing the Bounty on Corn* 404

## N U M B E R L X.

*Further Considerations on the national Advantage of the Bounty on Corn : In a second Letter from E. S.* 419

## N U M B E R L X I.

*A further Account of the Uses and Advantages of the double Plough ; particularly in the Cultivation of Horse-Beans : In a Letter from Mr. Randall* 423

## N U M B E R L X I I.

*Observations on the proper Manner of cultivating Flax, for the making very fine Thread ; on the making Cloth of Hop Binds and Nettle Stalks ; and on the applying the fibrous Part of the Stem of the Plantain, to the making Cordage, Fustians, Lawns, Knitting Work, Gauze, and Candlewicks : In a Letter from Agricola* 425

N U M-

## N U M B E R L X I I I .

*An Account of the instantaneous Improvement of Land, by turning up the Soil from two Feet depth, with the Aid of two different Kinds of Ploughs: And of the Structure, Manner of Use, and Expence of the respective Ploughs: In a Letter from Mr. Randall to the Editors* Page 438

## N U M B E R L X I V .

*Description of the biennial, and perennial Weeds, enumerated in Vol. V. p. 305, &c. In a third Letter from P. B. C. on that Subject* 441

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D I R E C T I O N to the B I N D E R .

Place the Copper-Plate facing Page 195.

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# Museum Rusticum, &c.

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For JANUARY, 1766.

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VOLUME the SIXTH.

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NUMBER I.

*Continuation \* of the Account of the Culture of the Teasel; in a Letter to the Editors of the Museum Rusticum, from Ruricola Glocestris.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

**I**N my last, the teasel heads were left deposited in a dry house, to acquire, from the gradual moisture of the air in the place, an additional elasticity to the hooks, and brighten in colour, 'till after Christmas; the time that generally the heads are sorted, and made out in the following manner. The handfuls are brought from the store-house into some large room, usually a barn-floor, where they

\* The former part of this very sensible, and explicit account of the culture of the teasel, is to be found in No. 57. p. 237. of Vol. III. The use of the teasel is confined to the dressing-cloth; for which purpose, it is used instead of instruments made of wire; and is so preferable to wire, that a clause was inserted in an act  
VOL. VI. No. 28. B of



they are untied one at a time; and generally made four forts of. The largest heads which are found, and are such as grow on the middle stem of each branch, are thrown for the first fort, and called *kings*. The next smallest which are found, and are commonly such as grow as side heads on each branch, are thrown for a second fort, and are called *middlings*. Another, or third fort, are such of the largest, or those which grew on the middle stem, as are damaged by the mildew, wet, or other accident; and which would have been kings, had not such defect rendered them unworthy that appellation. These therefore are thrown to a third fort, and denominated *scrubs*. The last, or fourth fort, is the refuse of all, and are such as are too small, or too much damaged for any use; and are therefore thrown away.

When a quantity is thus separated, they are made out in the following manner: the persons who do it, put off the kings ten in each handful. First, six of the larger, in the manner of a fan extended: and four lesser of the same sort, in the bosoms of the six; and then bind their stems together with a spleet of willow, or some tough wood, by wrapping it about them three or four times, and tucking the end under. When the kings are tied up in handfuls in this manner, a straight stick of about three-fourths of an inch diameter, and two feet six inches long, is split to

of parliament, to oblige the manufacturers of cloth to use the teasels only, under considerable penalties. The consumption, therefore, of teasels, is limited in proportion to the manufacture of cloth: but as one part of this kingdom has been supplied with them from another at a great distance, which consequently enhances the price, and perhaps renders it difficult to procure the best kinds at all times, it seems a matter of some importance to have the perfect knowledge of the best manner of the culture of them rendered general. Since, as they may be produced with nearly the same advantage every where, we must ascribe the neglect of cultivating them in the neighbourhood of places where they are most wanted, to an ignorance of the right means of doing it. The public, as well as ourselves, are, therefore, greatly obliged to our correspondent, who styles himself *Ruricola Gloucestris*, for this communication, as we believe, he is doing an essential service to his country, by contributing to promote the cheapness or goodness of our woollen manufactures. R.

within

within four inches of one end. Twenty-five of these handfuls are put on this stick, alternately head to stem; letting two of the middle stems of each handful be in the cleft, to hold them secure: then a small wreath, made of spleet, is slipped on the upper end of the staff, which holds it together, and keeps the whole from falling about. In like manner are the scrubs, or third sort, also made out and put in staves. But of the middlings, or second sort, double the number of heads are put in one handful, by making two fan-like rows of six each, and four in their bottoms on each side; and these are put into staves of three feet long each, spilt as the former, and thirty handfuls in each staff. When they are thus made out, they are fit for sale, and are to be laid by for that purpose in some convenient place, where they may not be bruised. Thirty staves of the first and third sort are accounted a pack, and forty staves of middlings make also a pack.

An acre of land, if well grown, and what is deemed a full crop, often produces nine packs of kings, nineteen of middlings, and two of scrubs. The common price per pack of the first sort, is twenty, the second sort fourteen, and the third sort eight shillings. But in a French war, they are generally double these prices.

*The Expences attending a Crop per Acre are,*

| 1st, Rent of the ground for the crop, which                                                | l.    | s. | d. |
|--------------------------------------------------------------------------------------------|-------|----|----|
| is one year and a half - - - - -                                                           | 5     | 0  | 0  |
| 2d, Ploughing and sowing - - - - -                                                         | 0     | 15 | 0  |
| 3d, First dressing or delving - - - - -                                                    | 1     | 0  | 0  |
| 4th, Second delving - - - - -                                                              | 0     | 10 | 0  |
| 5th, Hilling - - - - -                                                                     | 0     | 15 | 0  |
| 6th, Cutting and carrying home - - - - -                                                   | 1     | 15 | 0  |
| 7th, Tythe - - - - -                                                                       | 0     | 5  | 0  |
| 8th, Clearing off the stalks, and binding them<br>in bundles - - - - -                     | 0     | 5  | 0  |
| 9th, Making out, at two shillings per pack,<br>spleets, staves, and wreaths included - - - | 3     | 0  | 0  |
| All which make the total expence, attending<br>one acre of teasels - - - - -               | 13    | 5  | 0  |
| B 2                                                                                        | This, |    |    |



This, exclusive of seed, which is not often bought, because enough may be saved in making out the crop in winter: but if the seed be bought, it is generally valued equally with wheat. Therefore, if two bushels be sown on the acre, ten shillings may be added as the medium price; which makes the whole expence of one acre thirteen pounds fifteen shillings, if it should produce thirty packs. But such produce is not always the case, for twenty is to be esteemed a middling crop.

With respect to crops of corn, raised amongst the plants, it is usually practised in the places mentioned in my preceding letter on this subject; and indeed it has been mine to plant field beans, or garden beans, at about three feet distance singly from each other, in a promiscuous manner over the teasel land: which crop of beans, by the cultivation necessary for the teasel, is greatly forwarded in growth, and often produces from four to five and six stalks from one bean, well loaded with cods. This crop is no injury to the teasel crop the first year, and frequently pays the expence of labour attending the whole.

The crop, which generally succeeds the teasel, is wheat. The ground, by being frequently delved and kept clean, during the teasel crop, becomes very fit for this grain, and generally produces very large crops. Forty bushels per acre is not uncommon, though the land in itself is often such as is not annually worth more than ten shillings per acre. Hence, I think, it is evident, that a crop which well shades the ground, (in summer) and that has been two or three times turned and cleaned from all weeds, before such shading, greatly fertilizes the land on which it grows. But I have frequently observed an error, to which the occupiers of such land are too liable after these fertilising crops. This error is the ploughing away (by over cropping) the profits that would ensue. If after its being thus fertilized by the crops of teasels, it were to be laid down with suitable artificial grass-feed, sown amongst wheat, and properly manged afterwards, it would, I am experimentally sensible, be a lasting improvement. I am, gentlemen, desirous



rous that a supply of useful matter may be furnished instead of things merely speculative \* and controversial, neither of

\* We cannot agree altogether with our friend Ruricola, as to his sentiments of our last number, which certainly contained some very valuable pieces, even of the *practical kind*. It is possible, there were some others more prolix, and digressive than is necessary, but none trivial, or insignificant, as to the subjects themselves. We must beg of Ruricola to consider, that what we publish, with relation to agriculture, is not intended only to communicate the result of long experience, though that is one most essential part, but to incite and promote invention, and the trial of new articles of culture, and more profitable methods. Now, every new matter must be a *speculation*, before it can be reduced to practice: and as trials are in such cases sometimes attended with variety of events, it necessarily leads to a difference of conclusions, and that to controversial writing, by those who publish their opinions. This is, nevertheless, so far from being inconsequential to the public, that it can be only by such means all parties can be at length set right. For on the comparison of a number of various facts, the true reason of the variation will in time appear; and each person will be led to rectify his own opinion by the whole truth, instead of its being warped by partial observations. There can nothing more clearly illustrate this, than the very point of controversy, which gave rise to Ruricola's complaints; I mean the question, "Whether burnet be worth cultivating?" which turns on a previous question, "Whether neat cattle, sheep, and horses, or some of them, will eat it as grass or fodder?" Of this, we see extremely different accounts have been given. Some say they will eat it preferably to almost every thing; and others again say, they will not eat it at all. Seemingly flat contradictions: and yet we may venture to assert, that both parties are in the right as to facts, as far as they know them. For on a very large basis of information, privately procured from persons of unquestionable good sense and veracity, it appears, that in many instances the beasts before-mentioned will eat burnet greedily; and that others, nevertheless, refuse it as obstinately. Whence this proceeds, whether from the variation of the soil where the burnet is cultivated, or from the mixture of some particular species distasteful to the beasts, with that which they like, is yet undetermined; but certainly it merits our most attentive inquiry. If burnet be a proper food for these beasts, its extreme hardiness, and the greatness of the burden, at least on some kinds of land, would render it a very valuable article of culture. We must, moreover, beg of Ruricola, and other gentlemen who may have made the same reflections on some letters we have published,

which

of which produce but very little or no benefit to the practical farmer; and which, I am sorry to see, take so much room in the last publication.

RURICOLA GLOCESTRIS.  
L.

P. S. In compliance with your request, I have once more sent my conclusion of the culture of the teasel; and now take this opportunity to say, that the paper signed

which may not merit commendation in all respects, to observe, that where useful matter is sent to us, we cannot dictate the manner of writing, nor lop and prune every exuberance or redundancy that may shoot forth along with the fruit. We must, in some degree, take what our correspondents offer us, when any thing good is contained in it, as we receive the benefits of nature; and if we gain some sound grain, must not complain of the chaff and straw. Should we play the critic too strictly, we should give offence, and perhaps justly, where it would not be well to do it; as many are more fond and tenacious of their particular manner of writing, and jealous of correction in that point, than in what respects the merit of the subject. It is better, therefore, both for the public and ourselves, to bear a little with the particular humour of persons, who can communicate useful knowledge, than to lose the information by too great nicety. We hope, consequently, our kind friend Ruricola, whose own natural good sense, and application to practical knowledge, leads him to admire solid reasonings on known facts, delivered with method and conciseness, will not any longer think *speculation*, and even sometimes *controversy*, so wholly foreign to our purpose; especially as it is not practical farmers only, but for the most part gentlemen, who have acquired a taste for farming, whose attention we are to engage; and a mere detail of practical instructions, would not be so agreeable to them as a mixture of such, with ingenious speculations and hints, for the introduction of new articles, or new methods: and perhaps it is more the proper office, with respect to the public, as well as to the disposition of gentlemen, who take this turn, to be the enterprisers of improvement, than the imitative practitioners only of the Art of Husbandry. The great encouragement our work has met with from the public, inclines us to believe we are right in this opinion: for though every individual does not agree in liking every particular, as we are frequently told, but on the contrary indeed show themselves absolutely opposite in their choice, yet all concur in finding something worthy their notice; and this is what we are to make our principal aim: being, indeed, from the very nature of the thing, all that is possible in our power. R.

P. B. C.



P. B. C. No. 56. must, I think, be acceptable to many correspondents : and it would add greatly to its utility, if the proposal in the note thereon, signed R. E. O. was complied with : in order to which, if your correspondents, who are acquainted with botany, in the several counties, and places, would add the common names by which these weeds are called by them, they would, in all probability, become better known to the less learned reader, in which, if I find any steps taken to execute this plan, I intend to take some part \*.

R. G.  
L.

## NUMBER II.

*Account of the Cure of Worms in Horses, by the Use of Sea-Salt, Sal-Prunellæ, or Salt-Petre.*

*To the Editors of the MUSEUM RUSTICUM.*

*Experto crede.*

GENTLEMEN,

SALT having been recommended by some of your correspondents, I was induced to try it on a foal, which after weaning, was brought very low by small yellow-worms about an inch long (several of which were found in his dung) called in these parts, needle-worms. I thought the usual remedies too strong for a foal ; and therefore ordered him a spoonful of common salt, in a mash of oats and wheat-bran, every other night for a fort-

\* A complete history of weeds, distinguished by their vulgar, and local, as well as botanical names, with the time of their springing and flowering, and an account of the best expedients for extirpating those that do not submit to common and general methods, would certainly be a very useful work. The letter mentioned here, published in the *Museum*, for October last, and which, we have reason to believe, came from a very respectable hand, will, we hope, be the foundation-stone of such a performance : and we shall be greatly obliged to Ruricola, for the assistance he so kindly offers. R.

night,



night, keeping him in the stable at night, and turning him out in the day-time.

This, gentlemen, succeeded to my utmost wish: I could discover no worms after he had taken the salt a week; and he is now in full spirits and fine order.

I am told by a gentleman who constantly uses it, that there is no better preservative against the grease, than either sal-prunellæ or salt-petre: his method is, to give his horse, at first taking him into the stable, three doses of two ounces each, in mashes, one at night, and the second and third the morning and evening following; repeating it two or three times in a winter, as he finds occasion.

I received the first hint from your useful repository; and \* thought I could do no less than acquaint you with the success of my experiment.

I am, GENTLEMEN,

Mumby-Hall, Lincolnsh.

Your obedient Servant,

Dec. 16, 1765.

G. S.

### NUMBER III.

*Description of, and Observations on some proposed † Improvements on the Cutting-Box for Hay and Straw, in a Letter from Mr. Crockatt to Mr. Comber; and an Answer from Mr. Comber to him.*

SIR,

**I** Return you thanks for the many improvements I have received by perusing your letters published in the *Museum Rusticum*; and, as I make no doubt of your readi-

\* We are much obliged to this gentleman, and are of opinion, that nothing will more contribute to render our labours beneficial to the public, than the being able, by the communication of subsequent facts, furnished us in this manner, to verify and illustrate what has been before advanced in former letters. E. A.

† The cutting-box has been described, and its use explained, in the first Volume, No. 61. p. 258. and in the fifth Volume, No. 42. p. 208.

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ness to communicate any knowledge in your power to a brother farmer, and a friend to *all* improvements; I, therefore, take this liberty to trouble you upon the subject of a cutting-box for horse-meat.

I perused your letter, in that pamphlet, dated 29th March, 1764, wherein you are so good to communicate some proposals towards improving that instrument; and as I have employed a man, for above two years past, to cut straw and hay, when mixed together, into *chaff*, and (at feeding my horses, I mix two pecks of chaff with one peck of oats) I give the cutter eighteen-pence a score for cutting; and, I believe, he and his little boy cut above forty bushels a day, at this time of the year, and more in summer. Now, as my ploughman, &c. have but sixteen-pence a day in winter, and eighteen-pence in summer, I think, a considerable saving might be made, if I had a box of my own; and I had actually bespoke one from my wheelwright, on the thirtieth of September last; but on seeing your letter on that subject, I stopped him from making it, upon a presumption that a box made by your improvements would be better. I have since shewn your proposals to my wheelwright, who is a good workman: he and I both approve of lengthening the handle, as it will certainly give a greater purchase. As to your other proposal, of making three knives in place of one, I thought that would answer the benefit you proposed. But my wheelwright told me, that he heard of one that was made with three cutting-knives, by the directions of a man who lived in *Whitechapel* or *Wapping*, which he found to be so hard work, &c. that it did not answer the purpose; therefore he again uses one of the old fashion. As he neither knew the man's name, nor certain place of residence, so I have not been able to find him out.

My chaff-cutter says, he never heard of any new improvements; but there is one, I believe, you do not know of, *viz.* a piece of wood, *as long* as his box is *wide*, with three iron tongues in it, like those of a hay-fork, which he puts into the bundle of hay and straw to be cut; and by a rope

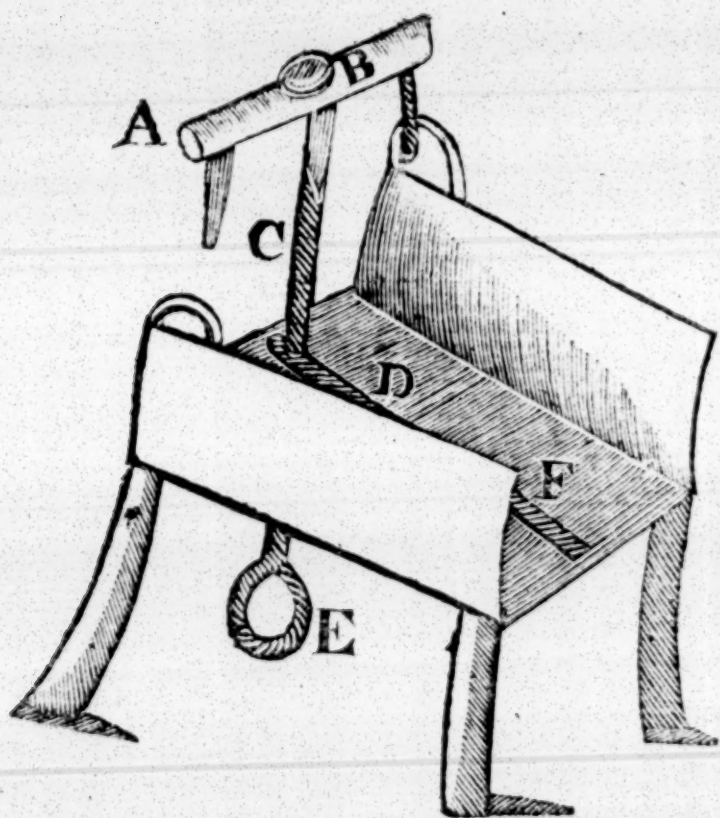


fixed thereto under the box, he presses that instrument down with his left foot, and, in consequence, keeps the bundle tight, by which means he cuts the chaff with great ease; and after every cut, raising his left foot, he pushes his sheaf or bundle with his left hand, and then presses it down with his left foot, and cuts with his right hand.

Next time he comes to cut for me, I shall be more curious in examining his machine; and if I know any thing new on the subject, I shall be glad to inform you. Meanwhile, I pray the favour, that if you know any of your proposals being put in *practice*, (as I observe yours is only in *theory*) you will inform me thereof, and its consequence; whereby you will much oblige,

Sir, your most humble servant,

JAMES CROCKATT.



*Explanation of the Machine for cutting of Chaff.*

A, The presser, which Mr. Crockatt's chaff-cutter uses.

B, The knotted top of the rope, by which it is fastened to the presser.

C, The



C, The rope.

D, The slit in which it moves, as the cutter pushes the sheaf forwards.

E, The loop, in which the cutter puts his left foot.

F, The box to contain the hay.

P. S. I cut chaff every three or four weeks; nor do I know what a friend to the *Museum Rusticum* means by *fresh and fresh*: surely, it is not *every day*. I have a drill-plow, three horse-hoeing ditto, one guide ditto, and two harrows, all made on purpose for the drill husbandry; and I believe they are *as compleat* a sett as ever was made. *Alexander Crichton*, coachmaker, in *Edinburgh, Scotland*, makes them, by the direction of an ingenious gentleman, who has been improving on *Tull* and *Du Hamel*. I have drill'd *burnet* and *lucerne* with them; also turneps, wheat, winter-tares or vetches, and *Scotch beer*. I received them only in September; about four weeks ago: and I have transplanted above fifteen thousand lucerne and burnet plants. They all thrive.

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SIR,

IN due course I received the favour of your letter, which needs no apology. I shall always esteem myself happy, to be able, by any communication, to oblige the *ingenious*, and especially, *improvers* of such *apparent candour* as yourself. As the study of *mechanics* made one of the most delightful parts of my employment in the university, I have occasionally, ever since, endeavoured to apply that knowledge to the good of the *laborious* part of my species. I have long been struck with that beautiful feature in Mr. *Philips's* character of a good man, (in his poem, *Cyder*) if I remembr aright, *viz.*

“ Intent on what may *ease* or *sweeten* human life.”

Your expectation, Sir, of *saving considerably*, by having a cutting-box of your own, used by your own servants, seems *plausible*, and yet ought not to be very much depended on, especially at the first, however judiciously it may

be constructed, for two obvious reasons, *viz.* 1st, that *practised* persons will do much more work, with an indifferent instrument, than *unpractised* ones with a very good one: and, 2dly, because no servants hired by the day, will do nearly as much work as those who work *good hands, good hire*. Whatever improvements, therefore, you make in your cutting-box, I should desire you to let your *old* cutter employ it for some time, without any talk of lowering his wages; and when ybu see what advantage he makes of such improvements, you may then argue him into a reasonable lowering of his wages, or take on a new one.

As to your wheelwright's objection to use three knives, it seems worse grounded than one would expect from a *good workman*, as you call him. He should have considered, that no *sensible* man can pay any regard to so *uncircumstanced* an account as he gives. If the work of that *cutting-box* proved *too hard* to be advantageous, it might be so from several *unknown* circumstances in the *construction* or *use* of it; and not at all from the *single* circumstance of having three knives instead of one.

But, if he had been acquainted with *all* circumstances, and it were sure, that the *overballancing* disadvantage arose solely from the circumstance of two additional knives; yet he should have considered, that, what might be an impracticable improvement on the *Whitechapel* or *Wapping* man's plan, might not be so on mine; for he had just seen, that by *lengthening* the *handle*, I *increas'd* the *power*; and that, in *direct proportion*, if he knows any thing of the principles of mechanics; so that if the *resistance* to be overcome, *increase directly* as the number of knives does, yet if the power be *increased* in the same *proportion*, that is, the handle made three times as long as before; the three cuts will be made with as much ease as the one was.

If your wheelwright be *ingenuous*, he may probably remember some circumstances of the person giving him the account; and the *Whitechapel* or *Wapping* man may be found out, and his instrument examined; for this is desirable: as experiments which do not succeed, often pay the expence



expencc of examination, while they point out things to be *avoided* ; juſt as ſucceſſful experiments do things to be *pursued*.

I think, ſir, I perfectly comprehend the mechanism of the *preſſer*, (for ſo I may juſtly call it) which your cutter uſes ; only, I apprehend, there is a ſlit, lengthwiſe of the cutting-box, in which the rope, faſtened to this preſſer, moves. But, *however uſeful*, or even *neceſſary*, this preſſer may be, in the *old* cutting-box, it will be utterly uſeleſs in my *improved* one ; the main deſign of which is, to diſpatch at *one* ſtroke, all the cutting neceſſary for the hay and ſtraw to be *at once* laid in the box. The improved cutter will cut in the ſame manner as the *celebrated Scotch* maiden, in the execution of criminals.

Betwixt every two ſtrokes, the cutten hay and ſtraw is to be cleared away, and freſh laid. And here, ſir, I muſt obſerve, that an answer to the objection of the hardneſs of the work in a good meaſure ariſes. On ſuppoſition that the work is *hard*, though, I believe, it may be ſo contrived as to be *eaſy*, the man who gives only one cut at once, muſt allow himſelf little or no reſpite ; otherwiſe he will diſpatch little work : but the man, who by his improved machine, gives three or more cuts at once, can well afford to ſtay 'till the cuttings are ſwept out, and freſh fodder laid.

How ſmall you propoſe to have your hay and ſtraw cutten, I know not, ſir : I apprehend you would have it cutten very ſmall, as you call it chaff ; which, with us, ſignifies only the hullings of the corn threshed. In proportion as you would have your hay and ſtraw cutten ſmall, you muſt increaſe the number of knives, ſo as to cut the hay and ſtraw laid in the box *at once*, into as many, and as ſmall parts as you wiſh.

The great principle of all *mechanical inventions* is to ſave *time*, *labour* and *expencc* ; or, in other words, with a *given power*, in a *given time*, to execute the *greateſt quantity* of work *beſt*, and with *leaſt expence*. The keeping of ſtraw and hay to be cutten, in a bundle cloſe and tight, ſeems  
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to counteract this great end of mechanics : for, by this means, the hay and straw become a *much more compact* and *solid* body, make greater resistance, and require greater force to overcome them, than if they were loosely spread over a larger surface. In order, therefore, to cut the hay and straw to the best advantage, I would increase the breadth of the bottom of the cutting-box, and, consequently, the length of the knives. In order that the edges of these knives may not be blunted *unnecessarily*, care must be taken in the construction of the bottom, that there be a groove correspondent to those edges ; so that the extremities of the knives may fall on what is solid, but all the middle parts may touch nothing when they have cut through the hay and straw.

Care must also be taken that the hinge may be very glib, and kept oiled.

If it is thought necessary, a spring also may be so fixed, by an upright standard from behind the hinge, as to be compressed, when the knives are raised, and by its elasticity to assist the force of the knives in their descent.

I proposed my former improvements, as I do these, as a *reasonable theory*, which there has been no room to put in *practice*. I want good *workmen*, and I have no *leisure* : hereafter I may make a trial. In the mean time, I recommend them to such *ingenious* and *candid* gentlemen as yourself, who have opportunity.

I should think, sir, that your method of cutting chaff every three or four weeks, might be nearly as good as cutting it much oftener. Indeed, the longer it is kept cut, probably *somewhat drier*, and *less nutritive* it may be ; especially unless it be kept close in an heap.

But in this country, sir, we have no idea of the *necessity* or *utility* of a cutting-box. 'Till I saw the account of one in the *Museum Rusticum*, I knew not that any such thing was ever used. I then saw, that as *mastication*, especially of dry food, is very necessary to *good digestion* ; and this again to *health* and *nutriment*, an instrument which anticipated this *natural operation*, (*viz.* mastication) must be  
very

very useful for horses, especially the *old* and the *young*, which cannot at all, or without great difficulty, macerate their dry food sufficiently by their teeth, which we justly call *grinders*. A *speedy* feed for horses is often very expedient, and especially in a course of labour, in which time is *precious*. The cutting-box, therefore, may be very useful; and this conviction of its usefulness, was the sole reason why the public was presented with the conjectures of,

SIR,

East-Newton,  
Dec. 2, 1765.

Your very humble servant,  
THOMAS COMBER.

I am glad, sir, to find that you have acquired so good a sett of instruments for the drill-husbandry. I shall enquire about them, agreeably to the directions you are pleased to give. You, sir, highly deserve the praises of the public for the trials you are making with these instruments in sowing wheat, &c. I hope you will communicate, by the channel of the *Museum Rusticum*, the effects of all your experiments, and that much the greater number of the plants which you have transplanted are of the *lucerne*, a grass I esteem every day more and more; while, on the contrary, I think the burnet so unvaluable, as to design to root it out of my ground.

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To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

AS Mr. Crockatt is your avowed correspondent, I conclude, he can have no objection to the publication of his letter to me, concerning the improvements of the cutting-box, with my answer. As all your readers may not easily apprehend the construction of the *presser* used by Mr. Crockatt's chaff-cutter, I have added a rude delineation of it, as apprehended by me, with a slit, which either *is*, or *ought to be* in the bottom of the box. It is true, that if there be  
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only an hole at F, the presser may be used ; but not with nearly the same convenience, as if by means of a slit, the rope be always perpendicularly under the presser. The wooden part of the *presser* must be broad enough to admit the head of the middle tooth to be fastened ; and also before or behind it an hole, for the knotted top of the guiding-rope.

I am, GENTLEMEN, as usual, &c.

THOMAS COMBER.

#### NUMBER IV.

*Observations on the Causes of the present high Price of Corn, and the Expedience of continuing the Bounty ; in a Letter to the Editors.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

**I**T has for some time been much debated, to what causes the high prices of corn and other provisions are to be attributed, and the proper means of reducing them. In a matter of such intricacy, it commonly happens, that people are of different opinions, according to the light in which they view it. The following reflections relate to one point only, the exportation of corn.

Many persons have supposed, that the high price of corn is owing chiefly to the exportation, and the bounty given by the government ; and your correspondent, *J. L.* in a very sensible Letter, No. XLV. of your 4th Vol. having touched upon some of the principal grounds of that opinion, they shall be duly attended to.

It is on all hands agreed, that granting a bounty upon corn exported, was a wise measure ; and that it has encouraged the farmers to make great improvements, and raise more corn than formerly ; insomuch, as *J. L.* supposes, “ that England produces as much grain in one



“ good year, as the home consumption amounts to in “ seven.” I have met with some other high calculations of this sort, and think it necessary to enquire particularly into them, from some of the best authorities we have, and the papers furnished by your ingenious correspondent Y. Z.

About ninety years ago, Sir *William Petty*, who was very skilful in political arithmetic, computed the people of England and Wales at about six millions. About twenty-five years afterwards, Dr. *Davenant*, another gentleman very curious in these matters, reckoned them only about five millions and a half; and that all the arable land then employed in raising corn, amounted to about eight millions of acres. It was the general custom at that time, to fallow every third or fourth year; so that the land actually under corn, was between five and six millions of acres; and at a medium of these estimates, there was then growing every year, nearly one acre of corn *per head*. This was sufficient for the home consumption; and very little was at that time exported.

It was also then reckoned that the people in England and Wales increased at the rate of somewhat less than a million in a century: this was sixty-five years ago; and if we state the increase since that time at a million, it may be thought a large allowance; and at this rate, the number of people will now amount to near seven millions.

The improvement of arable lands has made a quicker progress than the increase of people; for now there is a considerable surplus of corn for exportation. This improvement is not altogether in breaking up new land, not then in tillage; but partly by fallowing less of the same land; and perhaps in raising somewhat larger crops: and therefore the land now every year under corn, may not much exceed eight millions of acres.

Some may probably think, that this is not enough to supply the home consumption, and also the exportation. It is probable that the home consumption is rateably greater at this time, than it was sixty-five years ago; and that

near seven millions of people may, for bread, and all other uses for themselves, and cattle, &c. require now above seven millions and a half acres of corn every year. If this will serve for the home consumption, we shall have enough left to supply the exportation, as will appear from the following account of it, being the quantity exported, at an average of ten years, from 1747 to 1756, inclusive; in which more corn was exported, than in any other ten successive years.

| Corn exported. | Quarters | Value.      | Tons.   | Freight.  | Bounty.   |
|----------------|----------|-------------|---------|-----------|-----------|
| Wheat          | 447,291  | £.1,200,000 | 150,000 | £.300,000 | £.172,482 |
| Malt           | 311,591  |             |         |           |           |
| Barley         | 76,774   |             |         |           |           |
| Rye            | 67,202   |             |         |           |           |
| Oatmeal        | 2828     |             |         |           |           |

The quantities exported are agreeable to the custom-house accounts; and the bounty, and number of tons, are, I believe, nearly right. The value is computed at moderate prices; and the freight, being chiefly to Spain, Portugal and Italy, is, at a medium, reckoned at forty shillings *per* ton. These, though not exact, may serve to give a general idea of the exportation.

Admitting that there is produced annually, of these sorts of corn, three quarters *per* acre, the above quantity might, at that rate, be the growth of only about 300,000 acres, when the exportation was at the highest; which is not a twenty-sixth part of the land every year under corn: but it is a much smaller proportion, upon an average of these and former years; and therefore it seems very improbable, that so small a part exported, should raise the price so much, as is commonly imagined.

Let us next consider the opinion of our great crops. If they are in good years, enough for seven years home consumption, the medium, taking good and bad seasons, may be half that quantity; and then the crops every year, are sufficient for the home consumption three years and a half.

half. We have shewn, that the quantity exported is but a very small part of the annual growth ; so that when that is deducted, there will still remain every year, more than sufficient for three years home consumption ; and we shall lay up in stock two-thirds of this every year. At this rate, in ten years only, ending in 1756, we should have had a stock of corn, enough to serve us for twenty years to come ; whence then did it happen that corn was so dear in 1757 ? Can it be supposed that corn would be dear, while we had so much in store ? And yet, if this extraordinary fertility has been of any long standing, as suppose for thirty or forty years ; what surprising quantities of corn ought we to have now in the kingdom ?

But the truth is, whatever may be the crops in some extraordinary seasons, they are not much more than sufficient for the home consumption and exportation, taking them at a medium for several years. When they fall short of this, we have recourse to the stock in hand, and then corn advances in price ; and when they exceed, we lay up in store, and then corn becomes cheaper.

Dr. *Davenant* says, p. 82 of his second Essay, “ By the best accounts we are able to procure, from such as have looked into these things, we find, that in England, in a plentiful year, there is not above five months stock of grain at the time of the succeeding harvest ; and not above four months stock in an indifferent year.”

The difference here between a plentiful and an indifferent year, is but one month's stock, which falls very far short of the plenty now supposed in good years : and notwithstanding this slender provision in 1699, when this was written, and that corn was then dear, we find that for nine years afterwards, wheat never rose to more than forty-six shillings and six-pence *per* quarter ; and for six years after that, wheat was at near three pounds a quarter ; though the quantity exported in both these times was nearly the same. Also, for some years before 1699, wheat was above three pounds *per* quarter, though none was exported. All which shew plainly, that the exportation has but a small influence upon the price of corn.



Though the quantity of corn exported, bears a small proportion to the annual produce, yet, as a branch of trade, and in a national view, it is of great importance ; for the value of the corn exported, and the freight of 150,000 tons, shipped on our own bottoms, amount, at a medium of the above ten years, to a million and a half sterling : and as all this is the produce of our soil, raised by the industry and labour of our people, and employment of our own shipping, it is so much every year gained to the nation.

It is generally acknowledged, that we have got this profitable trade by the bounty ; but many persons are of opinion, that a bounty is now not only unnecessary, but very injurious ; that giving a bounty upon corn exported, is raising the price so much upon our home consumption, and sinking it to foreigners.

This is the principal objection made to the bounty ; it is popular, and seems plausible : but if it is now a just objection, it seems to be so against the bounty at first, as well as against its being continued : for if it now raises the price at home, and sinks it to foreigners, it has done so ever since it was granted ; and we have been industrious to improve our lands, and gain a foreign trade, only to make ourselves poorer, and for the benefit of foreigners.

But the objection is founded upon a mistaken or partial view of the matter ; for, if the bounty contributed nothing to make a greater plenty of corn, the argument would be of some weight ; but when it is acknowledged, and is undoubtedly the fact, that the bounty has excited a greater industry, and occasioned the raising of a much greater quantity of corn ; and when it appears that this additional quantity is equal to, or exceeds the exportation, the objection vanishes ; and the bounty, so far from being an injury to our own people, appears to be a benefit to them : they enjoy a greater plenty of corn, and a new branch of foreign trade is also gained, which is become one of the best we have.

We cannot determine generally, from the price of a single year or two, whether corn is cheap or dear ; nor is  
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the bounty chargeable with every accidental rise, which may be from other causes; and several other causes are assigned, which, no doubt, have some influence. But the question is, whether, upon the whole, and taking a number of years together, the bounty has raised the price. In this view it would, doubtless, be considered by the legislature; and is the proper rule to determine, whether the bounty is a national benefit or injury.

The following table, shewing the mean price of wheat at *Windsor* market, at several periods, for one hundred and sixty-nine years, will set this matter in a clear light; I have divided that time into periods of twenty-five years, (except the first, the account going no higher) to shew the progress of the prices; and then collected them into three longer periods, to give a more general view of them.

|                   | Years. | l.  | s. | d.              |   | Years. | l.  | s. | d.              |
|-------------------|--------|-----|----|-----------------|---|--------|-----|----|-----------------|
| From 1594 to 1612 | - 19   | - 2 | 2  | 5 $\frac{1}{4}$ | } | - 69   | - 2 | 8  | 5 $\frac{3}{4}$ |
| 1613 to 1637      | - 25   | - 2 | 7  | 4               |   |        |     |    |                 |
| 1638 to 1662      | - 25   | - 2 | 15 | 8               |   |        |     |    |                 |
| 1663 to 1687      | - 25   | - 2 | 5  | 3 $\frac{1}{2}$ | } | - 25   | - 2 | 5  | 3 $\frac{1}{2}$ |
| 1688 to 1712      | - 25   | - 2 | 8  | 5 $\frac{1}{2}$ |   |        |     |    |                 |
| 1713 to 1737      | - 25   | - 2 | 0  | 7 $\frac{3}{4}$ |   |        |     |    |                 |
| 1738 to 1762      | - 25   | - 1 | 18 | 2 $\frac{3}{4}$ | } | - 75   | - 2 | 2  | 5 $\frac{1}{4}$ |
|                   |        |     |    |                 |   |        |     |    |                 |
|                   |        |     |    |                 |   |        |     |    |                 |

By this it is evident, that wheat has been cheaper the last seventy-five years since the bounty commenced, than it was for ninety-four years before.

It is farther observable, that for the first sixty-nine years, the price of wheat was continually rising, and since the bounty was given, it has been continually sinking; which seems to be a plain proof, that this sinking of the price was owing to the bounty.

The twenty-five years, from 1663 to 1687, I have stated separately; because, in that period, a duty was first laid upon the importation of corn; which, with two additional duties afterwards, amounted almost to a prohibition; the consequence of which is here visible in the price;  
for

for wheat, which for many years before was rising, did at this time sink more than ten shillings *per* quarter.

The irregularities in the price, in some of the periods of twenty-five years, are to be accounted for from the history of those times. Agriculture is one of the arts of peace, and it flourishes most in peaceable times. A foreign land-war, and more especially a civil-war, very much checks its progress; deprives the husbandman of many of his best hands, and raises the price of labour. And accordingly we find, that at such times, wheat generally advanced in price; but not rateably in a naval-war, for obvious reasons.

As to the other part of the objection, that giving a bounty sinks the price to foreigners; if it opens a market for our corn abroad, and, at the same time, makes it cheaper at home, have we reason to complain? Or, can we expect that foreigners will buy of us, if we do not make it their interest to do so? But it is to be feared, that the opinion we have taken up of an extraordinary fertility of our soil, and a superiority in agriculture, are leading us into a dangerous error; and England, that was formerly liable to frequent scarcity, and sometimes to famine, for want of corn, is now imagined to have a monopoly of it.

What else is the meaning of that "opinion, mentioned by *J. L.* of some, conversant in the corn-trade, that "there would not be a quarter less exported, though no "bounty was to be allowed." Can any person, the least conversant in trade, believe, that eight or ten *per cent.* makes no difference to the buyer, if he can save so much by dealing elsewhere? And what else is meant by saying, "that foreigners are under a necessity of taking off large "quantities of these commodities," *viz.* our corn?

All the corn we have ever exported, upon an average of ten successive years, might be produced upon twenty-two miles square of land: and can we suppose that this secures to us a monopoly? Such an opinion would naturally lead us (as we see here it does) to raise the price upon foreigners; the consequences of which are certain, the loss of the trade, and a fatal blow to improvements in agriculture.



Many countries produce large quantities of corn, as well as England ; and several who have vast tracks of improveable land, are of late become sensible of the importance of agriculture, and are encouraging it with a spirit unknown to former times. Surely then, this is not a time to amuse ourselves with the notion of a monopoly, or take any step to slacken the industry of our farmers. On the contrary, we have great reason to apprehend, from such a competition, a decline of our corn-trade, and a check to the improvement of our lands ; and therefore it is necessary for us, now more than ever, to promote our agriculture, by every encouragement, while we have any waste or unimproved lands in the kingdom.

The example of other states laying up corn in public granaries, who have a small territory, where the lands are unfriendly to corn, or not productive of it without infinite labour, may not be advisable for us to imitate ; because our circumstances and situation are not at all similar. We have experienced the great benefit arising from the improvement of part of our lands, and exporting their product. We have several millions of acres more in Britain and Ireland to improve ; and if improved to what they are capable, what a vast accession of national wealth would this be to us ! While we are in this situation, it does not appear to be our interest to hoard up corn, but to trade in it.

There is one extraordinary circumstance respecting the price of corn, that deserves our particular notice. It is now about a century since corn began to abate in price ; occasioned, as before mentioned, by laying a duty upon corn imported. The price of all other things is very much advanced since that time ; and it would not, I suppose, be over-rating that advance at a fourth part ; and to say, for example, that the labour, which, one hundred years ago, was worth eight-pence, would now cost ten-pence. By the same rule, corn ought to have advanced also a fourth part ; and wheat, which was then at fifty-five shillings and eight-pence, should now be worth three pounds nine shillings and

and seven pence *per* quarter, as the common price : whereas the common price, for these last hundred years, has, in fact, been no more than two pounds three shillings and ten pence halfpenny *per* quarter ; so that wheat, instead of advancing, rateable to other things, has been sinking greatly ; infomuch, that for the last twenty-five years, ending in 1762, it has not been a great deal above half as dear as most other things. None of the common arguments will account for this ; for they all suppose that corn is dearer. Engrossing, forestalling, exporting, more trade, or more people, are all of them said to create an artificial or real scarcity of corn ; and consequently make it dear : if they really have this effect, the thing is still the more extraordinary ; that corn, notwithstanding all these disadvantages, has been so much cheaper than every thing else, and still, upon the whole, continues to sink.

Wheat has indeed been higher lately than the common price ; but when at highest, was cheaper than the common ordinary price one hundred years ago : whence is it then that the poor are really distressed ; and that corn should now be reckoned so very dear ? A clear solution of this difficulty, will, I apprehend, discover some other causes of the present complaint, than are commonly assigned ; and the true solution of it is recommended to the consideration of your ingenious correspondents.

I am, GENTLEMEN,

Middlesex,  
Dec. 12, 1765.

Your constant reader,  
and humble servant,

E. S.

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

AS the prejudices against the bounty on corn seem to gain ground, I thought it might be of use, at this time, to offer some reasons in favour of a measure, which I think of great utility to the public ; and if I am mistaken, I hope

I hope that some of the hints in the inclosed letter, if you think proper to publish it, may occasion a more accurate examination of this matter.

This letter growing too long \*, I have omitted some things relating to the subject, and but slightly touched upon others; particularly that of public granaries; which, in my opinion, are by no means adviseable in England; though I own the same scheme, and also withdrawing the bounty, have been strongly recommended by several persons of reputation; particularly by Sir Matthew Dicker, in his Essay on the Decline of Foreign Trade, from which your correspondent J. L. seems to have taken, almost verbatim, what he says upon these heads. But those opinions were taken up before the advantages of exportation were so well known as they are now.

The want of an improved drill-plough, seems to be one of the principal hindrances to the new husbandry; and having now one, that I think may in some measure remove that difficulty, I intend to send a model of it to your public-spirited Society.

I cannot conclude, without acknowledging the favourable reception you have been pleased to give to my former letters, and am,

GENTLEMEN,

Your obliged and most humble servant,

Dec. 12, 1765.

E. S.

\* We are sorry Mr. E. S. has omitted any part of what he might have otherwise thought proper to have written, on account of the length of his letter. We should very readily have found room for what he mentions, as we cannot doubt, but that solid reasonings on so interesting a subject founded on *data* of unquestionable authority, cannot fail to be as acceptable to our readers, as important to the public. Whenever, therefore, he shall think proper to favour us with a supplement to this letter, in discussion of the topic he hints at, it will be gratefully received by us. E. O.



## NUMBER V.

*Further Remarks on the several Kinds of Burnet, and its Use in feeding Cattle and Sheep, in a Letter from Mago to the Editors.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

**A**S the Reverend Mr. Comber does not appear to be so angry with me now, as he was some time ago, when he would account only *to you*, for what he had said on the subject of burnet; and as he seems to be got, where I plainly pointed to him he *was*, by my letter, Vol. IV. p. 227, so I shall now readily give him, and his northern friends, all the assistance I can, to help them out of their present difficulties: and in order to the doing of this, I must refer to my letters, p. 227 and 313, which I wish Mr. Comber would read once more, perhaps he will find them more important than he thought they were at first. In p. 228 he will see I then informed him, *the only point in dispute was, whether the cattle would eat it or not; and if they would, whether it was found to be nourishing food:* and in p. 229, I took the liberty of blaming the Society, for giving Roque fifty pounds, for cultivating burnet, *before it had been tried, whether horses, cows, and sheep, would eat it* \*.

\* The Society, on the first application with respect to burnet, had the strongest assurances, particularly from the late worthy Mr. Wyche, that not only neat cattle and sheep, but horses, would eat burnet with great readiness, and that it was a proper food for them. The bounty was not given to Mr. Roque till many months after it had been agitated there; and was not in consideration only of his having cultivated this herb, but as a reasonable return for his attention and trouble in giving information, and exhibiting the plant, and the method of culture of it, in a proper manner, to enable the Society to take measures for procuring adequate trials and experiments by the public, with relation to its general use. R.

I wont

I wont say in what light these observations yet appear to Mr. Comber, but I am persuaded his good friend Mr. Cooke is prepared to admit their propriety; for my part, I had some doubts \* as to the cattle eating it, from what I heard at that time, and, therefore, I said, it was the only, at least the only *material* point in dispute or doubt, and you, gentlemen, as editors, know, that I wrote you a letter, and begged you to communicate all that came to your hands, in regard to burnet, for we all knew it was to be raised from Roque's seed: and, therefore, I gave myself little concern about its botanical description, or distinction. I spoke of it as the garden pot-herb, and fallading burnet; and Mr. Comber surprized me much, by saying, in this Volume, p. 60, that the gardeners in the north *knew nothing* of its being an evergreen, a pot-herb, and fallad. I am much at a loss to account for their ignorance; for in the same number for July, p. 15, Sir James Caldwell says, "Roque bought all the burnet-seed he could get in London, *it having been used only in "fallads;"* and if Mr. Comber, and the northern gardeners, require further conviction, I refer them to the preceding paragraph, in which Sir James says, "he (Roque) took a handful of burnet and carried to his stables." From whence it is

\* It is beyond all doubt, at present, that there are instances of particular places where the beasts obstinately refuse to eat burnet; and of others, where, though they do not wholly reject it, shew they yet have some dislike to it. On our examining into the facts, it appears by very late information, that this cannot be owing to a mixture of feed, made originally by Mr. Roque, as has been ingeniously imagined; though there was a difference in the kinds raised from it, as far as regards seminal variety. But it being certain that the cattle fed promiscuously on what Mr. Roque raised from this feed, and that where parcels of it have been divided, and sown in different places, the cattle eat what was raised in one of these places, and refused what was raised in others, it can be ascribed only to the effects which different soils have on this plant. It were to be wished, therefore, that a distinct and satisfactory account of the attendant circumstances of all such places were obtained, that by comparing them it might be distinguished, where burnet could be advantageously cultivated, and where not, which seems all that is now wanting. R.



plain, it was then growing and could *only* grow in *his* garden as a pot-herb or fallad.

At present I have a very good opinion of Mr. Comber's head: and from the manner in which he takes the freedom I may use in this letter, I shall be able to judge of his heart. Thus much, therefore, for myself; and dropping all resentment for the indelicate manner in which he has heretofore treated me, I proceed with the olive-branch in my hand, and good-will in my heart, to acquaint him what further knowledge I have acquired, in regard to this new grass.

In the spring 1763, I first heard that burnet might be cultivated as a grass for cattle; in July 1764, I sowed a piece of ground with five pounds of Roque's burnet-feed; in October following I planted out two acres of light hot land, with my young plants, as mentioned in my letter, p. 229; in March last I planted two acres more, which compleated a field of four acres; every one knows that last summer was one of the worst that could be for a young plantation, however my plants all stood it out, without any assistance of water, and were, during the violence of the drought, of a most beautiful verdure: I cannot say the growth was very great, but weeds were very troublesome; however, I kept them down, and the plants stood over for seed, of which I collected about one hundred and sixty pounds; it was all picked by hand; for as Mr. Comber justly observes, much of the seed is lost by mowing; for when ripe, the least wind shakes it out; however, a very large quantity may be got by mowing; Roque mowed his this year and last; I saw his men thrashing it in the field, and they told me there was very near, if not quite, five quarters of seed *per* acre; as soon as I had collected what seed I wanted, I mowed part, and then turned four cows and two horses into the field; I observed the cows eat very freely, and that they preferred the lower part of the plant, as being most grass or leafy; the horses eat down the stalks, and all without any distinction; though I observed the horses did not seem to like it at first so much as the cows. What I mowed being about half made into hay, was carried



ed to the loft; and my coach-horses lived upon it near a month; in a day or two they took to it very well, and my servants were convinced they throve much with it. From hence, I was satisfied, that horses and cows *would* eat it; and as to the effect it had upon the cows, I must tell you, that after they had been two or three days in the burnet, my wife desired to know where the cows were feeding, for she observed a finer flavour in the butter and cream than usual; indeed, I had observed it myself, but would not mention it till I had seen if it was noticed by others.

A certain gentleman in Middlesex, who I have the pleasure of being acquainted with, endeared to his country by every instance of military skill and bravery, who notwithstanding his high rank in the army, spends much of his time in improvements in agriculture, employing his sword as a plough-share, though I cannot say his spear as a pruning hook. This gentleman also was fearful, that cattle would not eat burnet; I assured him they would; still he had some doubts; however, this summer he sent me word, that his doubts were removed, and he was become a convert, for that his cows had broke in three times upon his burnet, which was standing for seed, and eat very heartily of it. This account was attended with some particular circumstances, which showed that the cows were very fond of it.

Burnet-haulm, for I think it may be more properly called by that name than hay, after it has been thrashed for seed, Mr. Roque has for some time past cut into chaff, and sells at a very good price; and I have no doubt of its being a very hearty food. But I can no more agree with Mr. Lewis, than I could with Roque, in calling this haulm fine hay; but if cut in bloom, as I advised, Vol. IV. p. 314, I admit it will then be good hay: Mr. Lewis says it runs down in a spill six or eight inches; last autumn I saw my gardener digging up a bed of burnet, when I observed the roots were very numerous, strong, and some of them near two feet deep; this burnet was then about five years old.

Being satisfied that cattle would eat burnet, I determined to have some in broad-cast; and therefore, the oats be-

ing carted off a field of twelve acres, the land mere gravel, I ordered it to be ploughed directly: and the 26th of last August, it was sown with the 160lb. of seed before mentioned. The season being very hot, and no rain till the 18th of September, it did not appear till the 28th of that month; and being so late in the year, it has made but small progress; however, there seems to be a pretty good crop; and I intend, as soon as it has pushed up a little in the spring, to give it a good harrowing, in order to destroy or check the weeds: I do not perceive that harrowing hurts either burnet or lucern; I use common harrows, so does Roque; that, he mentions, is quite needless: I observe, when his lucern is very foul, he uses large ox-harrows.

Burnet will rarely make a mowing-crop the first year; and, therefore, I think it may be sown with propriety with barley or oats; and after the corn has been taken off about a fortnight, it should be well harrowed, or, which I think a better way, turn down the stubble, and sow it, if it can be done in August; the sooner the better. I have all along known, that Roque's burnet was of two kinds, which are well represented by figure 2 and 3, Plate I. Vol. V. No. II. is the green or most grassy sort, and Fig. III. the most stalky: whence I have little doubt of Mr. Cooke's being able to convince Mr. Comber, that the wild burnet keeps green all the winter; and, further, I am inclined to think Mr. Comber will find, what he calls his burnet, No. VII. to be the same as Roque's, No. II. the difference in Roque's burnet, I apprehend, was owing to his collecting his seed, at first, from different seed-shops; and, therefore, recommend it to gentlemen, who intend to cultivate this grass, to save the seed from II. or the green sort; for III. is of a much deeper colour, as well as more stalky and stiff: and had Mr. Comber read my second letter with attention, he would not have been so much surprized at what the *old-fashioned farmer* says of its being *stalky* or *stiff*. For he will find that, p. 314, I said, "burnet, when left to seed, grows "very *strong* or *slicky*;" and, I presume, this gentleman's

was



was nearly in this state as to ripeness; I, therefore, repeat it again, let it be cut in bloom. In p. 251, of your last Number, Mr. Comber tells us, "sheep appear to be very fond of the wild burnet, No. VII. for having been watched on the ground where it grows, since he wrote last, they have not left *one single head of it*, but have eat the leaf close to the ground, just as they eat down the finest species of the trefoil."——And in p. 300, Mr. Comber, from his friend Mr. Cooke's gardener, tells us, "that sheep, being turned into the burnet-field, fed upon the hedges and grafs-walks, *but would not meddle with the burnet.*" These different accounts surprized me much; and being very desirous of knowing how the fact stood, I ordered a servant to go directly to a neighbouring farmer, for a flock of sheep: and having a friend with me, we followed the sheep to the field before-mentioned, of four acres; the consequence was, that the sheep fell upon the burnet very greedily, and soon convinced us that it would be very proper to send them home again; which was accordingly done, as I had laid up the field for my cows in the spring.

Mr. Comber has certainly the pen of a ready writer; but he has been so voluminous on the subject of burnet, that he has wrote himself into no little confusion: at the beginning, when every one was busy in cultivating burnet, in order to know its uses, Mr. Comber began a dispute with Mr. Mills about its botanical name; and now that many gentlemen, as Dr. Lamb, Mr. Lewis, the Kentishman, that amiable gentleman the old *Essex farmer*, &c. are convinced of the benefit of cultivating it, Mr. Comber is amusing himself with telling us, p. 298, that it has been asserted, that Roque took the hint of cultivating burnet from the wild burnet *about London* keeping green all the winter, and yet, in the next page, he says, it is evident Roque has raised his burnet from the wild sort, *that grows about Garton in Yorkshire*: now neither of these are true; but true or false, they are no way to the point before us; and, therefore, all the remark I shall make on them, is, that they appear as contradictions, and want a little *correction*.

I shall



I shall now conclude with earnestly intreating; and I beg that you, gentlemen, will join \* with me in intreating every gentleman, who has cultivated burnet, that they will all favour the public, in your *next Number*, with a full and impartial account of their success. I should be glad, that each would say what cattle eat it, which they find prefer it most, and what consequences have followed from their eating it. The gentlemen I now particularly call upon, are Dr. Lamb, Mr. Lewis, the Kentishman, F. R. and A. B. (in regard to the success which Lord Northington had at the Grange) with every other gentleman who has cultivated burnet. The reason of my desiring that these accounts may all appear in your next number, if possible, must be obvious; in the mean time I would advise Mr. Comber and his northern friend, to be patient, not to determine rashly, or reason too much, on a matter that *must*, after all, *depend on simple facts*.

I am, GENTLEMEN,

Dec. 13, 1765.

Your most humble servant,

MAGO.

*P. S.* I am very glad that Mr Comber has employed his thoughts in improving the five-coultered, or, as he with much propriety calls it, the *manure-plough*. I shall be very glad to find that his is found, from experience, the most useful machine; for I am always happy when any attempt of mine to serve the public calls forth the pen of a gentleman of greater abilities.

\* We agree entirely with Mago, in his opinion, that the way to settle this important point is, to take a great latitude of information from those gentlemen, who have now cultivated this plant, long enough to have gained a competent knowledge of its qualities and effects; and if we are favoured with such accounts, we will either insert them at large, or, if too voluminous, abridge them, so that the whole may come properly before the public. O.

## NUMBER VI.

*Answer to the Queries, in a Letter from Mechanicus, inserted in No. 26. Vol. V. relating to the Management of his Farm, and the Manner of his laying down some Land in Grass.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

IN your *Museum* for November, I read the queries relative to some particular land, &c. signed *Mechanicus*, and dated from Stafford: as they seemed to me the queries of a person who really wanted the information he desired, I could not help giving them some kind of answer, and wish it may be of service to him, in case you will favour this with a place in your next publication.

*Mechanicus* says, he would lay his land down with grass, and that it is naturally a wet soil. The method I would advise him to pursue is, to gather a sufficient quantity of clean grass-feed by hand, and sow it in drills, about five or six inches apart. This should be done in the autumn, about the beginning of September, or sooner, if the season is moist. It must be hoed, and kept quite clean from weeds, the spring and summer following; and when they are ripe, they should be gathered or reaped, and threshed out, fit for sowing.

In the mean time, he should get his land as clear of weeds as possible; for which purpose, if it is not foul, he may sow a crop of beans in drills, which must be kept horse-hoed, as well as hoed by hand, during the summer. When the beans are off, and the land clean, he may plow it up, and fling in his grass-feed, after it is harrowed down, and then harrow it again; and if the ground works in large clods, it will require a roll to be run over it, both before and after the sowing.

But I should recommend it, as the best husbandry, to put his seed in by drills, which will give him the opportunity

tunity of hoeing it the first summer ; and will be of great advantage in the end, though certainly more expence at first. If he takes the latter method, a less quantity of seed will do ; as I myself have sown in very near two acres and a half of land, not more than a bushel of clean seed, and I believe, if my workmen had been used to the work, it would have gone farther, for they sowed it rather too thick.

From his account of his soil, I should imagine, that the meadow fox-tail, crested dog's-tail, vernal, and common poa-grasses, would succeed very well ; and they are all excellent sorts. But for his knowledge of them, I must refer him to Mr. Stillingfleet's observations on grasses, in his Miscellaneous tracts.

Though I have mentioned his sowing a crop of beans, I should not recommend that, unless his land is first very clean. The best way would undoubtedly be, to make a good summer fallow, and to sow the seeds in autumn upon that. This would be more expence, but he may depend upon a better crop of grass. He may take his own time for sowing it ; and may likewise be sure of having no weeds to over-run it the first year.

As to his queries about marling his ground, I believe, nobody can give a proper answer to, without having seen the land. But I apprehend, if it has not been quite exhausted with former crops and weeds, a summer fallow, well made, would intirely answer his end, and at the same time greatly lighten the ground. I would also advise him to sprinkle a little Dutch clover-seed over his ground the spring following ; that is, after sowing the grass-seeds, and to do it in a moist time. Timothy-grass, I am not much acquainted with ; but, from what I can learn of it, I do not suppose it has any superior qualities to most other sorts. It is, I believe, nothing but the cat's-tail-grass, whatever Mr. Roque may say of it, in order to sell the seed to greater advantage.

I am, GENTLEMEN,

Kent,  
Dec. 8, 1765.

Your constant reader,

PHILOMATH.  
NUM-



## NUMBER VII.

*Account of an Experiment to prove that Kine are fond of Burnet :  
And of an Improvement of the Method of making Bundles of  
Hay to be carried to Cattle.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

BY inserting my queries in your October and November *Museum*, I find that you have in some measure deviated from your original plan ; which was only to exhibit such pieces that had a tendency to improvements : this favour, gentlemen, lays me under a double obligation ; and is a distinguishing mark of your condescension and impartiality.

I should be extremely happy, if I could by any means contribute materials that would merit your regard, and be of advantage to the public. I yet have had but few opportunities, being involved in a constant hurry of business, that has hitherto allowed me but little leisure for contemplating the infinite variety of the vegetable creation, which will ever afford an ample field for displaying the talents of the most consummate genius, in their improvement and culture : a study worthy of the human faculties collectively, when considered as the absolute necessities of life, and indispensibly connected with our existence.

I am now, gentlemen, arrived to such a situation of life that will give me frequent opportunities of making some (I hope) useful experiments ; and if I am so happy as to succeed in my intended schemes of improvements, I perhaps may be a more acceptable contributor ; and wish, most sincerely wish, that the *Museum Rusticum* may continue its existence, to give me an opportunity of gratefully returning you, and the public, some adequate reward for your very kind indulgence : but perhaps already too much of superfluous introduction ; yes, the *Museum Rusticum* is de-

signed for nobler ends, than to be filled up with unavailing apologies, and contradictory altercations \*; I could rather wish to see a friendly emulation in the pieces of every correspondent, who have the honour to appear in so useful a collection of interesting particulars.

Gentlemen, as I have been, ever since I was possessed of my little farm, and the *Museum Rusticum*, very attentive to every useful improvement in husbandry, and in particular, to burnet; and was fond to believe every report in its favour, especially as it came recommended, seemingly, from gentlemen of fortune and integrity, who could have no other intention, by encouraging its culture, than the benefit and advantage of the public. This induced me, gentlemen, to desire (in a note to my letter in your last October and November *Museum*) that Mr. Roque would save me a few ounces of every species of grass-seeds he cultivates, the better, by personal cultivation, to ascertain their real and comparative merit, with other kinds that are more common, and transmit to you the particulars of my success.

I have observed with real concern, that Mr. Roque's integrity is called in question; and I think that his character hath not had that equitable regard paid to it, which yet, upon a further examination, it will be proved to deserve.

\* We heartily join with Mechanicus in this wish; and should take it as a favour of several of our correspondents, that they would let their remarks be confined to the abstracted subject, and only produce arguments in support, or for the refutation of the opinions or doctrines they espouse, or oppose, without reflections or criticisms on the manner of writing or personal character or conduct of each other. The complaints of many of our readers on this score, and the concern we ourselves are under, to see our work made the vehicle of censure, and even resentful expressions, oblige us to seek some remedy for this evil: and we rather chuse to take notice of it on a general occasion like this, than to have recourse to the disagreeable task of remonstrances and reproofs to particulars; hoping this intimation will meet with proper notice from several gentlemen, whom we should be extremely sorry to disoblige by a more particular explanation. R.

I was



I was greatly alarmed with the character that the Rev. Mr. Comber gives of Roque's burnet ; and the more so, as I have always viewed him as a gentleman of fortune and integrity, and strictly impartial, and above prejudice : and yet Mr. Comber affirms, that he has offered his burnet to a sick foal, a colt, and to all his cows, and every one of them refused it ; and even his hogs, who eat most kinds of vegetables, did not meddle with it. I have not the least doubt but the above is strictly true in every circumstance ; yet I am inclined to believe, that the burnet Mr. Comber mentions, is not the burnet of Roque, but of some other species, taken to be his by mistake.

I am naturally led into this opinion by the following experiment which I made yesterday : I was informed that a gentleman at Stafford had a little patch, in a field adjacent to the town, sowed with burnet, by way of experiment. My curiosity being raised, and suspended by the various and contradictory accounts of it, published in your *Museum*, determined me to go to Stafford, and enquire for the field where the burnet grew. I soon found the desired curiosity, which was remarkably flourishing, considering the manner of its cultivation, which appeared quite neglected, the ground being covered with a multitude of weeds. I knew it to be burnet, from the drawings of it given in the *Museum*.

The soil being light and sandy, I easily drew up with my hands half a score of the plants, some of which had perpendicular roots of eighteen inches long, with a few horizontal fibres : but to be farther satisfied that I had got the real burnet, I immediately went to the gentleman's shop (being an apothecary) and asked for a penny-worth of borax ; at the same time I shewed him a small burnet plant, and inquired of him the name of this curious plant : his answer was, Burnet. Without asking me any further questions, he told me, he had a small parcel growing, and that his horse was very fond of it. I hope, gentlemen, you will pardon my unjustifiable method in procuring it ; but, as I had little personal acquaintance with the gentleman, I despaired of getting any by more lawful means.



I am the more particular in my account, as burnet stands judicially condemned as an unfit member in the commonwealth of vegetables for pasturage : and Mr. Comber recites, that a gentleman of his acquaintance affirms, that “ the recommendation of it is a gross imposition on “ the public.” Mr. Comber very ingenuously confesses, that he does not immediately acquiesce in it. Permit me, gentlemen, to beg a momentary respite for the unhappy convict, burnet ; and suffer the under-mentioned fact to be fairly stated, and then, with the impartial public, I am well assured the character of the poor delinquent, in some measure, will be re-established, at least, so far, as to have another fair trial.

I returned immediately home, and went to a piece of land where I had four cows : however, I first washed my plants, as they might, I thought, have contracted something disagreeable to the cows, by drawing them out of the earth, and carriage. After this, I offered a burnet-plant to a cow, whom I knew to be remarkably nice : but to my great surprize, she greedily snatched it from my hand, and eagerly devoured root and all ; and before I was aware, she fastened on the plants I had in my other hand, which I intended for the other three ; they also shewed the same eagerness, and eat them as greedily as the first.

I leave you, gentlemen, and your correspondents, to make what conclusions you judge proper ; but be assured this representation is simple truth, and absolute fact \*, and divested of the least exaggeration. I sincerely wish that

\* As Mr. Comber, in your last Number, page 255, intimates, that no great stress, as to facts, can be laid upon the assertions of such of your correspondents that conceal their names ; and in the next page, the same gentleman seems desirous of having authentic certificates produced of cattle’s liking burnet : this is therefore to assure Mr. Comber, that if it be of any consequence to himself or the public, to know my name, by intimating in the *Museum* such desire, him or they shall be immediately satisfied, and have also authentic testimonials of the fact, as I have in my letter affirmed ; and if it were convenient or agreeable to the above-mentioned gentlemen, I would send him a couple of burnet-plants of the same kind I made my experiment.

every

every contributor to your work would be as careful in representing experiments, as I have been in this ; for facts should be the ultimate end of theoretical knowledge, and the basis whereon we should found our judgments ; without which we shall be hurtful to society, by misleading others that might be better employed, in the fugitive chace of fanciful pursuits and unavailing speculations.

Before I conclude, I must beg leave to recommend a small invention of my own, but not without its utility. Hay being this year remarkably short, consequently very difficult to be bound up in bundles of sufficient size to carry out as fodder for cows, &c. I have seen several miscarriages by the hay slipping out of the cord, as servants have been conveying it into the fields, and have seen it strewed about the street like refuse upon a dunghill, which I think is a great pity, as it is this year so extremely scarce. The method I have invented is this :

I procured two cords of equal length, made pliant and soft to prevent them twisting ; they need not be so strong as a common foddering-cord, as they form a double bandage. I nailed them down upon a barn-floor, in a parallel direction, twenty-two inches asunder : I got a smaller cord, and began at the ends of the greater cords, where I had fastened nooses of iron, for the greater facility of binding ; the cords drawing much better through them, than through nooses of cordage. I made the small cord sufficiently fast, by putting it twice through the plaits of the thicker cord, about four inches below the noose, and fastened it in the same manner to the other cord, four inches below the other noose. I then carried it back to the first cord, and fastened it twelve inches below the place where I made the first fastening, and so carried it on from cord to cord, in a zig-zag form, for about four feet ; the remaining parts of my cords were unlaced for the drawing together of my bundle. You would be surprized with what facility





and neatness the shortest hay may be bound together with this cord, and carried to the intended place, without the least loss : a child may bind it together, as it does not require to be bound so tight, as in a single cord ; and but little care needful in placing the hay in it when spread upon the floor. In a word, when bound, it is inclosed as if it were in a net, the larger cords turning over the extrem ends of the hay, and forms something like a purse. If you think this not a sufficient explanation, I have annexed a drawing, but that may be added or omitted at your pleasure, as I think the above description sufficiently plain. I wait impatiently for your next Number, and hope I shall not be disappointed of receiving an answer \* to my queries, through the good-nature of Mago, &c. I should be glad, gentlemen, to be indulged with a place in your next Number, for I am much concerned for Mr. Roque, and his adopted burnet. I am, gentlemen, a friend to society, so far as my abilities and influence can extend, and

Your obliged and grateful humble servant,

Near Stafford,  
Dec. 8, 1765.

MECHANICUS.

P. S. At the receipt of your last Number, I had almost finished a letter that I intended for your collection, much of the nature of Agricola's. See No. L. of your last publication. But my intention is intirely precluded by his more masterly and ingenious piece. I hope Agricola will not delay obliging the correspondents of the *Museum Rusticum* (to whom it cannot but be very acceptable) with those pieces he mentions in the last paragraph of his very sensible letter.

\* Mechanicus will find an answer to his queries in the article immediately preceding this, which is a letter from Philomath. We are very glad to have been the means of his obtaining what he desired, and hope it will be satisfactory to him : and we are obliged to him for the promise he makes us of his future correspondence ; not doubting, but that, from his apparent ingenuity and earnestness, he must succeed in making experiments and observations worthy being communicated to the public. O.

NUM-



## NUMBER VIII.

*Method of Propagation and Culture of the Scotch Fir, Spruce Fir, and Larch.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

THE following observations, founded on experience, induce me to send them to you, and if they will not take up the room of any thing more deserving \* a place in the *Museum Rusticum*, you have leave to insert them in your next volume of that entertaining serviceable work.

*Observations on the Propagation and Culture of Scotch and Spruce Firs.*

The methods that appear to me the quickest and best for raising a plantation of these species of firs, are to gather in February or March the largest and most compact cones of thrifty flourishing trees, not less than fourteen or sixteen, nor more than twenty or twenty-five years growth. Trees of eight and ten years old, and often before they are that age, bear cones; but I am doubtful whether their seed be good. I know it is a remark of some sensible planters, that an early produce of cones is a sign of weakness in the plant: and I should neither choose the seeds of old declining plants, nor of young sickly ones. If the cones be exposed to the sun a few days in a shallow deal or tin box (the latter of which I should prefer, as it reflects the heat) they naturally expand, and the seed is easily obtained. The seed cannot be sown too soon, and should not be delayed

\* The subject, as well as the intelligent and satisfactory method with which it is treated, renders this letter highly deserving a place in our *Museum*; and we shall be greatly obliged to the gentleman, from whom it came, for any future favours of a like kind. R.

longer than the beginning of May. I think it best to sow the seed in fresh prepared drills, about a foot asunder, as near the surface as possible, and for the plants to continue two years on the seed-bed, free from weeds. In April 1754, a gentleman in Norfolk, six miles south of Norwich, began with two-year old plants, thus raised, to plant a very barren, mountainous, gravelly piece of land, of fifteen acres, observing to place the spruce firs in the valleys and southern exposures. The first and second years, for he was four or five years before he could raise plants sufficient to compleat it, he did not begin to plant till the eighth of April; the other years in February; but as the plants of the two first years planting are better, bating the difference of age, I am inclined to think April the properest month for transplanting them. The plants in general, of the whole plantation, are now in a fine growing state, particularly those of the first year's planting, and from the following dimensions of a score of each sort, I judge the Scotch firs to be, at a medium, about sixteen feet ten inches high, with stems sixteen inches in circumference, at two feet from the ground; and the spruce firs thirteen feet eight inches high, with stems nine inches in circumference, at two feet from the ground; but I am convinced their growth has been greatly forwarded, by constant hoeing and keeping the ground, which was a clean summerlay when planted, loose and free from weeds.

Respective

Respective heights of  
twenty Scotch furs,  
and their circum-  
ferences, at two feet  
from the ground.

|        | Height.<br>Feet. In. | Circumf.<br>Inches. |
|--------|----------------------|---------------------|
| 1      | 17 8                 | 17                  |
| 2      | 18                   | 20                  |
| 3      | 19 6                 | 20                  |
| 4      | 11                   | 9                   |
| 5      | 13 9                 | 16                  |
| 6      | 14 4                 | 15                  |
| 7      | 18 10                | 17                  |
| 8      | 20                   | 20                  |
| 9      | 12 6                 | 13                  |
| 10     | 20 9                 | 19                  |
| 11     | 12 9                 | 14                  |
| 12     | 17 9                 | 19                  |
| 13     | 20 4                 | 19                  |
| 14     | 15                   | 14                  |
| 15     | 20 5                 | 20                  |
| 16     | 14 6                 | 18                  |
| 17     | 17                   | 19                  |
| 18     | 17 10                | 17                  |
| 19     | 23 6                 | 23                  |
| 20     | 11 6                 | 10                  |
| <hr/>  |                      | <hr/>               |
| 336 11 |                      | 339                 |

Respective heights of  
twenty spruce furs,  
and their circum-  
ferences, at two feet  
from the ground.

|       | Height.<br>Feet. In. | Circumf.<br>Inches. |
|-------|----------------------|---------------------|
| 19    | 4                    | 17                  |
| 14    | 7                    | 12                  |
| 13    |                      | 10                  |
| 12    |                      | 7                   |
| 11    | 5                    | 7                   |
| 11    | 6                    | 6                   |
| 8     | 4                    | 5                   |
| 13    | 6                    | 8                   |
| 11    |                      | 6                   |
| 16    | 3                    | 10                  |
| 20    | 6                    | 19                  |
| 20    | 9                    | 14                  |
| 16    | 2                    | 10                  |
| 9     | 6                    | 9                   |
| 21    |                      | 14                  |
| 21    | 4                    | 22                  |
| 10    |                      | 6                   |
| 8     | 6                    | 5                   |
| 7     |                      | 6                   |
| 9     |                      | 5                   |
| <hr/> |                      | <hr/>               |
| 274 8 |                      | 198                 |

Three hundred and thirty-six feet eleven inches, the total height of the Scotch firs, I measured, divided by twenty, is sixteen feet ten inches; and three hundred and thirty-nine inches, their total circumference, at two feet from the ground, divided by twenty, is sixteen inches, or one foot four inches: two hundred and seventy-four feet eight inches, the total height of the spruce firs, I measured, divided likewise by twenty, is thirteen feet eight inches; and one



hundred and ninety-eight inches, their total circumference, at two feet from the ground, divided in like manner, is nine inches. They were all planted at four feet distance, though those of the two first years planting are now reduced to eight, twelve, and, where they are most vigorous, to sixteen feet. It is undoubtedly right to plant them thick at first, and to thin them by degrees, observing to take away the sickly, deformed, double-headed ones, and to save more than sufficient to grow to timber of those that are flourishing and upright; for their leading shoots are, by high winds, accidental blights, or birds lighting upon them, when young and tender, frequently broke off, and in dry summers they are liable to be damaged by insects; besides, as the method of trimming, I should prefer, is that of cutting off the branches as they die: another main reason for leaving a superfluous number, is, because confinement, and want of air, are the means of killing the lower boughs; but notwithstanding I most approve this way of pruning, I believe, when the plants are about ten or a dozen years old, a single tire of branches may every November be cut off about six inches from the stem, and close to it the following year, till they be trimmed fourteen, sixteen, or eighteen feet, or higher, if the planter likes it. When a tree gets two leading shoots, hesitation about cutting off the worst is needless; nor should I ever scruple taking off a lateral branch that disfigures the tree, especially near the bottom. Though I should always like an excess of good plants, for the reasons afore-mentioned, till they be at the distance of about sixteen or twenty feet from each other (as they may happen to stand) at which distances I think they may be left to run to timber, yet they should never be suffered near enough to hinder each other's growth; and those parts of any plantation, where the plants are most vigorous and thriving, will require and well deserve the attention of the planter, to guard against that inconvenience, by a timely cautious thinning. Another rule to be observed in thinning a plantation, is, to leave the plants thick on the outside, for though they are generally forked and unsightly,

ly,

ly, they are a necessary defence to the inside plants; and in open hilly countries the planter would do well to follow the direction of Mr. Marsham, who in his very accurate and judicious observations on the growth of trees, published in the Philosophical Transactions, Vol. LI. No. II. p. 7, says, "woods of fir should be guarded with an out-line of birch and beech, to break the force of strong winds."

I meant to have limited my letter to the Scotch and spruce firs, but as five hundred two-year old larches were, in February 1757, planted in the most exposed northern part of the aforementioned plantation, are very vigorous, and from the mean height of half a score I measured, I look upon them to be, one with another, about sixteen feet high, and their stems twelve inches in circumference, at two feet from the earth. I must take notice that a dry gravelly soil seems proper for them.

To conclude, regularity, in the already thinned parts of this plantation is broke as much as possible, it being thought more pleasing to the eye, and the plants less apt to be damaged by boisterous winds.

I am, with much esteem,

GENTLEMEN,

June 21, 1765.

Your most obedient servant,

R. C.

*P. S.* As these heights and circumferences are reduced from mensurations, taken before the 24th of June 1765 (consequently before the shoots of the year 1765 are perfected) it may fairly be supposed, that at the end of the year, the Scotch firs will be about four or six inches, the spruce firs, which do not begin to shoot so early, about six or eight inches, and the larches, which are quicker growers than either, and continue shooting in length till near Michaelmas, about eight or ten inches higher than they appear to be by these dimensions.

## NUMBER IX.

*Account of the Nature, Culture and Use of the Turnep-Cabbage ; explaining the Reasons for the Premium offered by the Society for the Encouragement of Arts for that Article : In a Letter from Agricola.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

**I**N my last letter to you, I promised the subject of my next should be the consideration of a point of high importance to the public. What I then meant was, *Observations on the Practicability and Means of the Production of Silk in Great-Britain* : a matter which, under the present circumstances of our commerce, could it be attained, would be of the greatest moment ; and on which, it is perhaps possible to throw some lights at present that may have very interesting consequences. But the Society for the Encouragement of Arts, &c. having published a premium for the *culture of turnep-cabbage*, which consequently renders that an object of more immediate attention, I shall postpone the other ; and here give the best account I can of this plant, as far as relates to the intention of the Society in that premium : as I conceive it will aid their views ; and gratify the curiosity of many of your readers, to be made acquainted with the material particulars relative to this new object.

The *turnep-cabbage* is so called, because the stalk, at some distance from the ground, after rising of the usual thickness, and in the manner of those of other cabbages, enlarges suddenly to such a degree, that it forms a knob of the magnitude of a common turnep ; of which, likewise, it has sometimes the figure, though generally it is more oblong.

By this peculiar formation of the stalk, or production of the turnep-like knob, together with its being perennial, this species



species of cabbage is distinguished from all others. From the top of this turnep rise a number of leaves, of a greenish-red, or sometimes greenish-purple colour; which answer to the radical leaves in other plants. They do not, though this plant is truly of the cabbage kind, ever close together, and form a compact globular or oblong mass, as in the common species; but keep their erect growth, or turn outwards.

From among these leaves spring a number of other stalks, of which, those that are nearer the extremity, branch, and send out flower stalks, spreading horizontally; and those that are more in the center, grow erect, and without branches. On these stalks are leaves, springing out alternately, and of the same colour with the others. The flowers are small and yellow, and succeeded by long cods, full of seed, of the size of that of mustard, and a light-brown colour. It may be justly doubted, whether or no this plant be originally a native of our country; though it is at present found growing wild in some places near Dover. But, from its general character, which does not agree with the indigenous plants of the same kind; from its being unknown to the earlier botanic writers, or, at most, known only in the view of an exotic; and from its being now to be met with wild, only in the one place mentioned, it is most probable, that what is there found, was the produce of seed conveyed originally thither by some accident; and which has since propagated itself, and spread spontaneously, as it easily might, from its perennial nature and extreme hardiness. It is frequently cultivated in gardens, where there are collections of vegetables: but, for the most part, rather as a curious than an esculent plant. Though certainly, the turnep, or knob, is at least as wholesome as either any turnep or cabbage, and is much liked by some; and the leaves are also thought good by others; but in general, both are said to be strong, and seldom admitted to the table with us. This plant, however, affords sprouts, which, after they have undergone the action of a strong frost, are exceeding good; and may consequently be had at the  
time

time when all others fail. The lying in very small rooms, proportionably to the quantity of solid substance, and the keeping good much longer than any other sort of vegetable of a similar nature, are qualities, moreover, which fit this plant in a most peculiar manner for the use of seamen, as is ingeniously remarked by Mr. Baker, in his report to the Dublin Society: but of this I shall take more particular notice below.

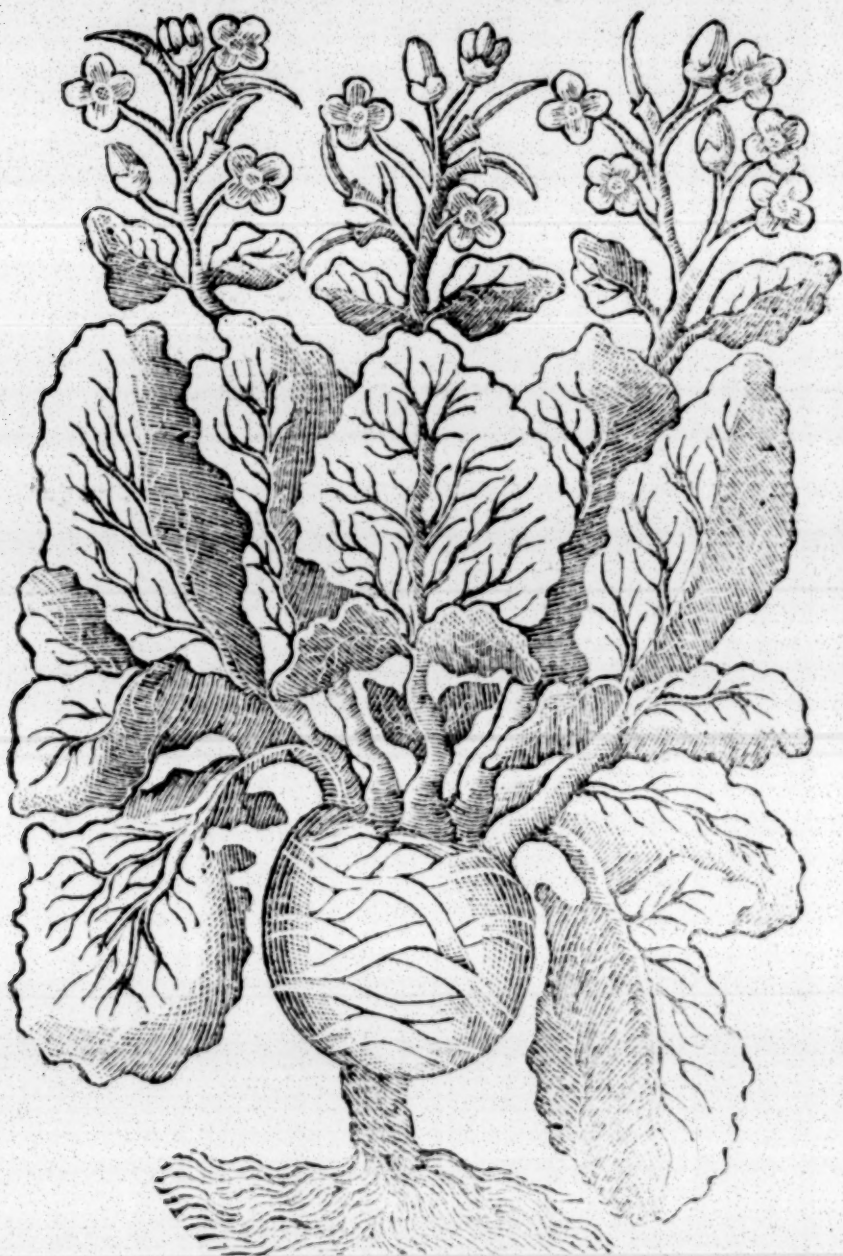
It appears from Gerard, that there were, in his time, two kinds of this plant; one of which he calls *Caulorapum rotundum*, or round rape-cole; and the other, *Caulorapum longum*, or long rape-cole. The difference of these two kinds consisted only in the form of the knob or turnep, as is expressed by the names themselves; and in the long kind's shooting forth smooth indented leaves from the turnep part, which leaves the round kind wanted. I have here sent you a sketch of these two kinds, according to the prints Gerard has exhibited of them; and they may serve also to give some idea of the general figure of the plant, to those who have never met with it.

I have not however seen in any garden, nor find any traces in the late writers, of more than one kind of this plant; so that if the *round* and *long* kinds, mentioned in this manner by Gerard, were really different species, the long is now lost. But it seems more probable, that this was only a degeneracy of the plant, by means of the *farina* of the common kinds of cabbage; as the deviation from the round knob towards the plain stalk, and the breaking out of the leaves from it seem to indicate.

If there really were two original kinds, or this difference arose from a permanent feminal variation, it would merit attention under the present circumstances to recover them; since it frequently happens in correspondent cases, that where there are two allied species, the one has qualities which fits it to a particular purpose in a very superior degree to the other. This plant was rare in Gerard's time in our country; as he mentions his having the seed from Spain: and indeed it was so little known, that he says it



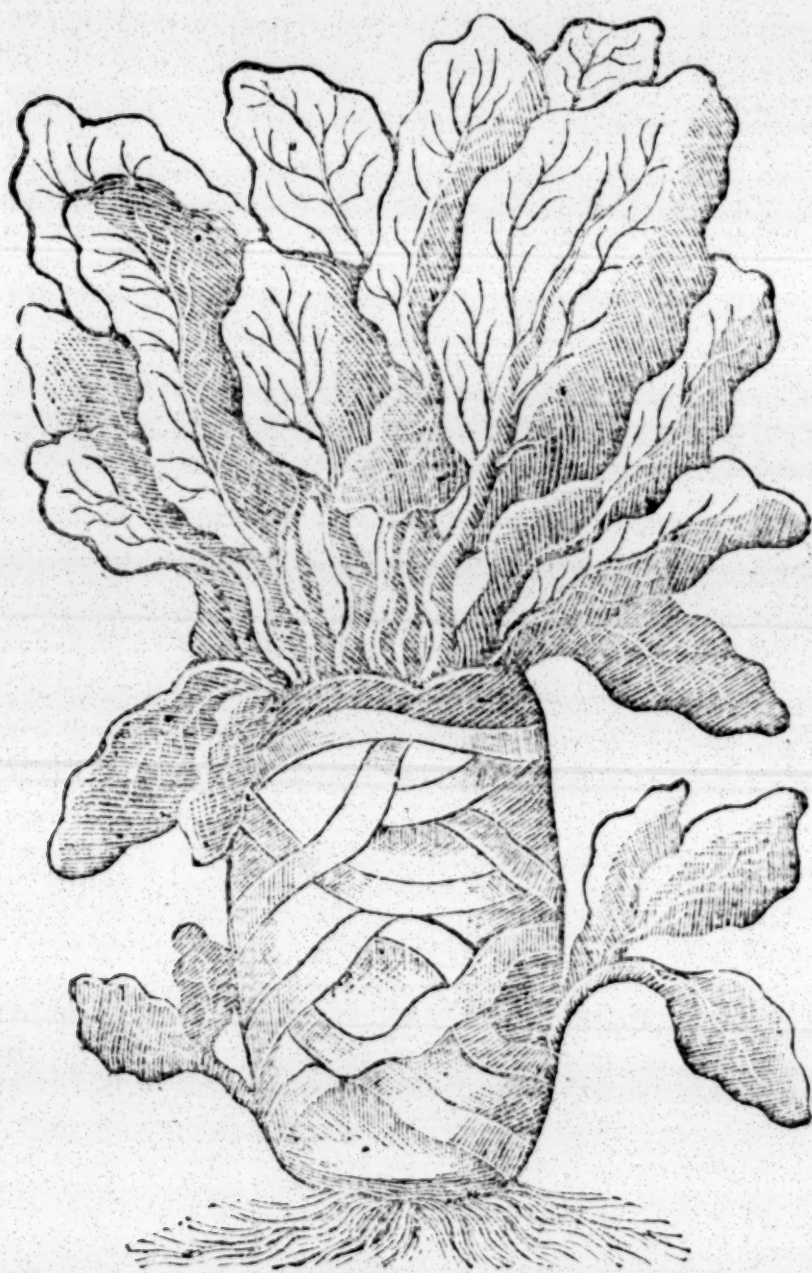
*Caulorapum rotundum*, Round Rape-Cole, or Turnep:-  
Cabbage.



is to be sown and set as cucumbers and melons ; and that it was then accounted a dainty meat. It did not, however, make its way to the table in common, or even as a curiosity in gardens, much more at that time than since. For Parkinson, who wrote after Gerard, and enumerates many more species of cabbage than him, does not take the least



*Caulorapum longum*, Long Rape-Cole, or Long Turnep-Cabbage.



notice of it. Tournefort, and most of the later writers, mention this plant under the various names of *Brassica conglodes*, *Brassica caule rapum gerens*, *Brassica caulescente orbiculari carneso foliis sessilibus*, *Brassica radici napiformi*. But they do little more with regard to it, than give the name and description. Miller, in his *Gardener's Dictionary*, says, this kind of cabbage “ never varies, for I have cultivated

“ it many years, and have not found it to alter. It grows  
 “ naturally on the sea-side, near Dover. It hath a pe-  
 “ rennial branching stalk, in which it differs from all  
 “ other species. I have cultivated it these three or four  
 “ years, and have eaten the young shoots, after they have  
 “ been much frozen, when they were very sweet and good ;  
 “ but at other times they are very strong and stringy. In  
 “ very severe winters, where the other sorts are destroyed,  
 “ this is a very necessary plant, for the most severe frosts  
 “ do not injure it.”

Till lately we see, therefore, this plant was only considered, either as a kind of curiosity in botanic, or other gardens, where there were collections of different kinds of plants, or as an esculent herb : but, in this latter view, it seems not to have acquired any great reputation, as it is so seldom, even notwithstanding Miller’s recommendation, met with on the table here ; though I am well informed, that in some of the factories in the East-Indies, it has been cultivated from European seed, and is much liked.

The first public notice I find taken of this plant, in the present view of cultivating it for feeding cattle, is in a pamphlet published by the late Mr. North, gardener, near Lambeth, who speaks of it, under the article of cabbage ; of which he says, “ There are four species that may be  
 “ cultivated to great advantage for cattle ; to wit, the  
 “ *white cabbage*, the *hardy curled Savoy cabbage*, the *turnep-*  
 “ *cabbage*, and the *green curled cabbage*.” When he comes to treat particularly of the turnep-cabbage, he thus expresses himself: “ The turnep-cabbage is one of the hardiest  
 “ roots that grow ; and I dare affirm, might be propagated  
 “ to great advantage for feeding sheep, &c. For in the  
 “ most severe winter that I can remember, when cabbages,  
 “ favoys, turneps, &c. have all been demolished by the  
 “ extremity of the weather, the turnep-cabbages have not  
 “ been hurt. The turnep part grows all above ground,  
 “ which is crowned with many large smooth leaves, like  
 “ those of the red cabbage, but which grow open like the  
 “ tops of turneps. They are a very solid juicy root, and do



“ not grow spongy when they are old, as turneps do.  
 “ The tops may be cut off, and given to sheep, &c. in  
 “ the spring, and the roots laid by in an out-house to  
 “ feed them in April and May, when no other roots can  
 “ be had. Sheep are so fond of these roots, that they will  
 “ leave the best turneps for them. When they are given  
 “ to sheep, they should be cut to pieces; but they will  
 “ eat them fast enough, tops and bottoms, as they are  
 “ growing in the fields. After Michaelmas, when turnep-  
 “ cabbages have their full growth, they will weigh from  
 “ four to eight pounds a root.”

It may be proper here to caution against a misconception, from the inaccuracy of an expression of Mr. North's, in calling the turnep-like part of this plant, a root: for it is no more than an enlargement of the stalk in that part; being, when the plants are large, several inches above the ground. It is proper to observe likewise, that Mr. North has under-rated the weight of these plants; it appearing, by Mr. Baker's account, that some weigh fourteen or fifteen pounds. This is the first notice I find in any published work, of this plant's being considered as proper for feeding cattle: but it appears in the minutes of the Society's books, that some little time before the publication of this pamphlet, on the enquiry set on foot by the late Mr. Wych, concerning a proper food for cattle in hard winters, this plant, together with the Chinese or white vetch, and the Syberian medicago, were proposed to the Committee of Agriculture for their consideration, by a gentleman well known to that Society; and this plant was particularly recommended for its hardiness in the ground, its quality of not rotting, though long kept, its nutritive property, and the fondness which cattle shew for it, when offered to them as food.

Mr. Baker, nevertheless, whose report on this subject to the Dublin Society you published in your October and November *Museum*, No. 52, Vol. V. must have the honour of being the first who really introduced this plant into use, as an article of husbandry. For it was on the authority of his judicious experiments, related in that report,



report, the same gentleman, who formerly recommended the turnep-cabbage, as above-mentioned, to the London Society, induced them now to offer a premium for its culture : and there is no one object of a similar nature, hitherto taken into consideration, either by this Society, or that of Dublin, which bids fairer for being of great public utility : as this plant seems to answer all the ends of what was sought for, with so much pains and attention, in the research set on foot by Mr. Wych, after a proper *winter pabulum* (as it was called by him) for cattle in scarce winters. I, for the more satisfactory illustration of this in practice, must refer to the particulars of Mr. Baker's report, which perfectly verify what Mr. North, and the gentleman above-mentioned, delivered in theory.

The turnep-cabbage may be cultivated in the manner of other cabbages ; of which the particulars may be seen in Miller's Dictionary. But the success Mr. Baker had with his method, particularly in relation to the magnitude of the turnep, which seems to go far beyond Mr. North's notion, recommends strongly the trial of that manner ; except that, as he properly remarks, where the plants are raised in the spring, the seed should be sown in the very beginning of March ; the plantings, transplanted to a proper close bed, as soon as they are sufficiently strong to bear it ; and the final transplantation of them out into the field at the distances in which they are to grow, should not be deferred later than the beginning of June. This would both give more time for the plants to become large before winter, and a better chance to avoid a total want of rain, after transplanting ; the only accident, except the destruction by caterpillars, or other insects, to which this kind of crop is subject ; as the plants bid defiance, after they have firmly taken root, to all inclemencies of weather, either with respect to cold, wet, or drought.

It may be inferred from the above particulars, which, as we see, stand on unquestionable authority, that, considered as an article of husbandry, this plant must be a very valuable acquisition : as it is of easy culture, and as little  
subject

subject to fail by accidents, as any crop whatever : as the produce, with respect to quantity, is likely to prove, under favourable circumstances, thirty-five or thirty-six tons per acre, as appears from Mr. Baker's account : as its produce greatly preferable either to turneps or other cabbages ; being much more nutritious, and less watery and cold ; a fault in the common turneps : as it may be depended on in the most rigorous and severe season, when every thing else but dry fodder fails, and may be taken from the place of growth, in case of exigence, whenever the ground is not covered with a very deep snow : and as it is much liked by neat cattle, sheep, deer, and hogs ; agrees perfectly well with all of them ; and fattens them in the most profitable manner. This is certainly very sufficient ground of recommendation, as an object of premium, to the London Society ; and it is hoped, will be so, as a subject of experiment and trial to those gentlemen, or more liberal kind of farmers, who attempt improvements in husbandry.

I have thus endeavoured to give all the light I can into the nature of this plant, considered as an article of husbandry : but before I end this letter, I beg leave to subjoin a few words respecting it in another view, of such importance to a particular set of men, whose health and safety manifold reasons recommend to the care of the public, as makes it merit a very serious consideration. What I allude to is, the intimation given by Mr. Baker, of the probability that this plant might be rendered extremely serviceable to seamen in long voyages. As there can be no doubt of the just foundation of this opinion, it ought to be kept in sight as much as possible, till the matter be realized in practice. The putrid scurvy, arising from the eating salt provisions, is the great bane of a seafaring life. The numbers disabled or carried off by it, particularly in time of war, are almost incredible ; and, if we consider the public value of lives so lost, both with respect to the national power and expence, policy, as well as humanity, bids us listen to every feasible proposal for mitigating this evil. The use of vegetables in the diet along with the salt-beef or pork, is well

well known to be one of the most effectual means of prevention of this disease : and indeed, it has been so well understood, that great quantities of cabbages, &c. have been sent off to the fleets cruising in the bay, or elsewhere within reach, to the great relief and refreshment of the men. But this species of cabbage, abounding more in the saccharine juice than the other kinds, would be a more efficacious preventive or palliative of the scurvy ; and the solid compact texture of these turneps, which makes a considerable weight, lye in a small compass, together with their repugnance to that putrefaction, to which other turneps, cabbages, &c. are quickly disposed, renders it practicable to keep them on shipboard, in any climate, for many months ; provided they be preserved from the access of any extraordinary degree of moisture.

If this plant should be, therefore, generally cultivated in the field-way, and consequently produced at a very cheap rate, as Mr. Baker has shewn, that betwixt thirty and forty tons may be obtained by an easy method of culture, in one year, from one acre of ground, they might be purchased at a much cheaper rate than any other article of provision at present in use for the victualling ships.

This seems to be an object very well worth the consideration of the India Company ; as it might be a means of preventing that delay and ill success of some voyages, which arise from the sickness of the men ; and it is attended with no difficulty, but what regards the stowage. For the plant being already cultivated in some of the factories in the East-Indies, where it succeeds as well as here, and consequently might in all the others, as no climate or season appears injurious to its growth, it might be procured at a proportionably cheap rate, as well for the supply of the homeward as outward bound ships : and indeed, considering the nature and state of the provisions on board ships returning from India, it would undoubtedly be peculiarly beneficial in that case.

I shall now conclude with one more observation. The Society have required, in the conditions on which they offer



fer their premium for the culture of this plant, that an account should be sent by the candidates, of their respective method, success, application, and other particulars relative to it. But as numbers of gentlemen, or farmers, may take up this matter without any concern with the premium, it would be very material, to the promoting the advantages that may accrue from the introduction of this new subject, if such of them as meet with any extraordinary event, or practise any extraordinary method, would impart the particulars to you. And, indeed, those who are candidates, may advance the views of the Society much, by doing the same: as the Society has at present no appropriated channel to communicate matters of this kind to the public, and only insert them in journals that fall into few hands, and die with the day; which consequently renders the publication rather an embarrassment to them, than a benefit to the public.

I am, GENTLEMEN,

Your humble servant,

AGRICOLA.

## NUMBER X.

*Two Premiums offered by the Society for the Encouragement of Arts, &c. the one for a Machine for slicing Turneps; the other, for cultivating the Turnep-cabbage.*

*Premium for a Machine for slicing Turneps, now first established by the Society for the Encouragement of Arts, &c.*

**F**OR the best cheap machine for slicing turneps, in order to feed cattle, that will dispatch large quantities with more ease and expedition, than by any method now practised, twenty pounds.

To be produced to the Society, on or before the first Tuesday in November 1766.

*Premium*

*Premium for the Culture of Turnep-Cabbage, now first established by the Society for the Encouragement of Arts, &c.*

**F**OR raising and duly cultivating the turnep-cabbage, for the feeding cattle and sheep, on the greatest number of acres (not less than three); and giving an account of the soil, culture, time of taking up, produce, and their effects on cattle and sheep fed with them, twenty pounds.

For the next greatest number of acres (not less than two), fifteen pounds.

The certificates, agreeable to the above conditions, to be produced to the Society, on or before the third Saturday in March 1767.

The same premiums are continued for the year 1767; and the certificates are to be produced on or before the first Wednesday in November 1768.

## NUMBER XI.

*Process for making Pot-ash, communicated by Mr. Dossie, to the Society for the Encouragement of Arts, &c. With Observations tending to illustrate the Question, Whether the same could not be practised in Great-Britain with Advantage? In a Letter from him to the Editors.*

*To the Editors of the MUSEUM RUSTICUM,*

GENTLEMEN,

**I**N compliance with your desire, and that of your correspondent, who signs himself T. P. expressed in his letter, published in the *Museum Rusticum* of last month, No. 66. I have here sent you the *Process for making Pot-ash*, communicated by me to the Society for the Encouragement of Arts, &c. at their request, and inserted for several years past in their book of premiums for the colonies. And in order

to render it more conducive to the purpose for which it is demanded of me, I have subjoined such farther information and remarks on this subject, as, I think, might give the best lights towards determining the query, whether *this process might not be practised in Great-Britain*, with advantage, as well to the undertakers, as the public.

*“ Process for making Pot-ash ; with Directions for performing it with Profit by private Families, where Wood is plentifully burnt.*

*“ THE utensils and implements necessary for making Pot-ash in smaller quantities are——*

*“ Vats for dissolving the Salts*, which may either be round like casks, or square. They may be made of the best white pine, or cypress; and if they be round, they must be well secured with iron hoops; or, if square, with an oaken frame. They may be about four or five feet in depth, and of any diameter or width, according to the occasion there may be with relation to the quantity of wood-ashes for the making the pot-ash. These vats must have a kind of false bottom, formed by making a sort of lattice-work, or grate, by placing boards with the edge upwards, cross each other; so that the spaces, or areas, betwixt them may be about five inches square, and eight inches deep. The cavities or hollows formed by these boards, must communicate with each other freely, by holes cut in the lower edge, where it rests on the real bottom of the vat; and a vent must be made from the outside of the cask into one of them, on the same level, by means of a cock, in order to draw off any fluid from them: or, in the place of such lattice, bricks may be laid at the distance of four inches from each other, on the real bottom of the vat.

*“ A Receiver for the Lye*, which may be any kind of wooden vessel, that can be conveniently placed under the cock of the dissolving vats; and will contain the lye as it runs off.

*“ Vats*



“ *Vats for containing and keeping the strong Lye* till the time of evaporation, or the *weak Lye* till it can be put upon fresh ashes, for rendering it of due strength ; which may be casks, or any other kind of vessel that is tight, and will hold the due quantity.

“ *A caldron of iron for evaporation*, where larger quantities are in question, which may be set in the manner of a copper for domestic uses ; only a considerable part of the bottom must be left exposed to the fire. It may be greater or less, according to the quantity of ashes employed for the making of pot-ash. But where private families intend only to employ the ashes produced by their own fires, or them with some additional quantity not great, a large iron pot, such as is usually had for dressing victuals, or other like uses, may be best employed, and requires only to be hung over a kitchen, or other domestic fire ; by which the expence of fuel, and trouble of separate attendance, may be saved in the principal part of the evaporation.

“ *An iron rod*, a little longer than the depth of the iron pot or caldron, flatted at one end in the manner of a broad chisel, for scraping frequently the bottom of the pot or caldron when the lye begins to thicken ; else the bottom of the pot or caldron will soon burn out by the salts sticking to it, and keep the heat from evaporating the lye.

“ *An iron ladle*, to be used when the lye grows thick, as it is then apt to boil over, even with a moderate fire, more especially when the scraper is used ; a sudden heat being caused when the salts are removed from the bottom of the pot or caldron.

“ *An iron rake*, with close teeth, for separating bits of wood unburnt, or reduced only to the state of coal, from the ashes.

“ *A strong broad iron chisel, with a wooden mallet*, for cutting the salt out of the caldron or pot after the evaporation.

“ *A pair of small common scales, with two phials of equal contents and weight*, for determining the strength of the lye.

“ *Potash* is the fixed alkaline salt extracted from the ashes of burnt vegetables, and may be obtained from any kind of wood found in North America, except evergreens which abound in turpentine; as the pines, firs, cypress, cedars, &c. But though most kinds will afford some proportion, yet the large forest trees, whose leaves fall in the winter, such as oak, ash, beech, &c. when felled in a state of decline from their age, and soon after committed to the fire, yield the greatest quantity. 3V002

“ The wood may be either burnt for domestic uses, in common hearths or stoves, or purposely for the ashes, on any dry flat spot of ground: but where a work is intended to be carried on at all times of the year, a kiln built of any commodious form with iron bars over a capacious ash-hole, secured from being flooded by rain or melted snow from the contiguous ground, is most convenient. The wood should be thoroughly burnt, and where there appear to be any remaining bits in an unburnt or coaly state, they should be carefully raked out by the means of the iron rake above described, and thrown again on the fire.

“ As soon as the ashes can be removed from the place where they are burnt, let them be put into a cask, or laid on a floor in a shed, and gently moistened, and worked together, till they form a stiff paste-like mass; in which state they should be rammed as close together as possible, and kept about three weeks, or till such longer time, as there may be a proper quantity collected for extracting the salt.

“ When the ashes are thus ready, let them be put into one of the vats above described; the lattice or grate of which must be first covered with coarse wheaten or rye-straw, about the thickness of a foot; and in this vat they must be well rammed together as they are put in. When the vat is thus filled with them, let the surface be hollowed towards the middle, so as to form as it were a basin to receive the water to be poured in. This hollow or basin may be four or five inches deep, and must not extend quite to the edge of the vat, but must leave a small margin



gin or shoulder of the ashes, to prevent the liquor from flowing to the sides of the vat, and finding a passage there, instead of soaking equally through the whole mass.

“ When the vat is thus prepared, fill the basin or hollow in the ashes with soft water, till they will imbibe no more, and then, after standing some time, turn the cock at the bottom of the vat, and draw off the fluid, which will now, the salts being dissolved, become a lye, into the receiver mentioned above. Remove the receiver, and put fresh water on the ashes, supplying the basin from time to time, till what runs off be void of taste or smell.

“ By this means a stronger and weaker kind of lye will be obtained, which must be put into separate vats; and, if the strong contain a sufficient proportion of salt, it will be ready for evaporation. To know this, the most certain method is to weigh it against other lye made of the first degree of strength; which may be most easily practised by filling two phials, of equal contents and weight, with each kind, and observing the difference. But it is not required, that this lye should be of any precise standard; only that it should be as strong as it can conveniently be made, to save time in the evaporation. A moderate deficiency of strength, therefore, may be allowed: as the trouble, occasioned by bringing it to the full strength, would be greater than that of evaporating it; and if it will float an egg, it may be suffered to pass, where there is no inconvenience in prolonging the evaporation. When, however, the first lye is found too weak, it must be put on fresh ashes, and drawn off as before directed, till it become of due strength. The weaker lye, or second running, must also be put on fresh ashes for the same reason, and in the same manner; and if none be ready at the time, it must be kept till a fresh quantity be obtained.

“ The lye being obtained of due strength, it must be either evaporated in an iron caldron, in a proper furnace, as above mentioned, where larger quantities of pot-ash are to be prepared; or where only smaller quantities are in question, in the iron pot. In which latter case the greater  
part



part of the evaporation may be performed on the fire of a kitchen, or other room, that is large enough to admit of boiling the pot.

“ In the evaporation of lye in the caldron, the fire must be kept as strong as is practicable, without occasioning the fluid to boil over; and, as the quantity diminishes by exhalation, it must be again renewed, till the caldron, or pot, will receive no more, without being above four-fifths full, or till the whole quantity of lye to be evaporated be put in. The fire should, however, be abated, when the salt appears to form on the surface, to prevent the waste, and other inconveniencies, of an explosive bubbling that may otherwise throw part of it out of the caldron; and the heat must be continued under due regulation, with respect to this accident, till the watery exhalation be wholly finished. After which, even if the fire be increased, part of the matter will remain in the state of a blackish-brown fluid for some hours, where the quantity is not small; though the heat being duly kept up, the whole will become solid, of a stone-like hardness, and light brown or white colour. In the case of large quantities, and consequently of a great caldron, a very considerable degree of heat is required in the last part of the operation.

“ The same method must be followed, when the iron pot is used over a common fire, till the water be wholly evaporated. After which, this kind of fire being insufficient to bring the salt to a due state of dryness, a stronger must be supplied to finish the operation, which may be made in this manner: take off the pot from the first fire, and chusing a proper dry spot of ground in the open air, let the three feet of it be there raised a foot or more from the ground, by means of bricks laid on each other, with the ends pointing to the center of the pot; and not passing further under the feet than may be just necessary for their resting firmly on them. Put under the pot, and betwixt the bricks, pieces of dry wood of a convenient size, as also chips to make them burn more commodiously; and, having set them on fire, keep a due heat, as before directed

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ed in the case of the caldron, till the matter be dry and hard; which may be easily done, by supplying fuel on each side of the pot, as it appears wanting.

“ When the mass is perfectly dry in the caldron or pot, and become whitish, or white, when suffered to cool, suppress the fire; and as soon as the diminution of the heat renders it practicable, cut it out with the chisel above-mentioned, and pack it up in tight casks that will secure it from the air. This kind of pot-ash is not the same with the Russian, or any other, except some that has been brought here from America; *nor is it, in fact, strictly speaking, a pot-ash; the other kinds being produced by throwing the lye on burning straw, or other vegetable matter; by which means the calcined earth, or ashes of such vegetable matter, is mixed with the salt.* But this being consequently a purer salt, is superior in value; and when justly sold, bears a greater price, as it may be used with more advantage in the making hard soap, which occasions the far greatest consumption of these salts.

The above is the process communicated by me to the Society, and which has been carried into execution in America with such success, that a very great quantity is now annually imported from thence hither. Though this process was calculated at that time for the use of the colonies, yet the directions for making the pot-ash would equally well serve here: there being nothing, except an information of the kind of wood proper in that country for making the vats, that peculiarly respects America.

As to the benefit, the public would receive from the production in Great-Britain of a considerable quantity of pot-ash, or fixt alkaline salt in any commercial form, it cannot be doubted by those, who are in the least acquainted with the subject. The consumption of this kind of commodity is every day increasing in the British dominions, as it is a necessary article, as well in the linen manufactures, as in callico printing, and many others; and at the  
same



same time, the supply from the north-eastern parts of Europe is constantly failing more and more : so that the price of late years has been greatly advanced, and would have soon risen to a height which might have been very injurious to our trade, if we had not found resources for the obtaining this article in some of our own countries. It may be said that this is, however, effectually provided for, by the present establishment of the manufacture of pot-ash in America ; but though that may be a reason for being less solicitous to obtain this article here, than we otherwise should have been, yet it by no means renders it wholly indifferent. It may probably be a considerable time before all we consume can be supplied from thence. The effect of the fall of price, when greater quantities are produced, and a rivalry created betwixt the European manufactures of this commodity, and the American, may check the progress of it there ; as freight, insurance, &c. particularly in time of war, will always be sensible disadvantages of the American produce, compared with the European. Disturbances, and even revolutions, may also happen in those colonies ; which may interrupt our commerce with them, or greatly change the relations of it to our interest. All which render the supply of every such article much more precarious, when we depend on them for it, than when we are actually possessed of the manufacture of it at home. And, after all, supposing we could obtain any considerable quantity at home, from the ashes of wood at present consumed for domestic or other purposes, and which are now thrown away, why should we waste what would turn materially to the public profit, and employ some hands, perhaps at present idle, any more in the case of this, than that of any other article of produce or manufacture ? The question, therefore, that remains to be decided, is, Whether or no the manufacture of pot-ash may be carried on here *with profit to the undertakers*, by means of the process above given ?

In order to judge the better of this, and answer some difficulties, it is proper to consider what sort the pot-ash



is, which such process affords: and, in order to that, it becomes equally requisite, to examine a little more particularly into the nature and preparation of pot-ash in general; and even of fixt alkaline salts, of which this is a kind. For, without a due previous explanation of those principles, it is impracticable to speak intelligibly of a subject so complex, and out of the common road of knowledge.

FIXT ALKALINE SALTS are of two species; the one is called the *vegetable fixt alkali*, and the other at present the *fossile alkali*. But though they have real differences, as well with relation to their natural production, as to some of their properties, cognizable by means of chemistry, yet they are, nevertheless, promiscuously used for many purposes in manufactures. All the fixt alkaline salts of either species, which make any article of commerce, are obtained from the burning or incineration of parts of vegetables, by washing or melting them by means of water out of the ashes, where they are produced, and afterwards freeing them again from the water, by evaporation with heat. But, as various means of operation are employed for this purpose, and some of the salts are, consequentially to these operations, left mixt with a proportion of the earth of the ashes, while others are wholly freed from it, and rendered pure, and undergo moreover a change likewise, by a subsequent calcination practised on them; they bear different names, and a different marketable value. All the difference in them, nevertheless, consists correspondently to this view of their production and preparation, in the being of one or other of these two species mentioned; in their degree of purity, or in their having, or not having, undergone the subsequent calcination.

The *vegetable fixt alkali* is prepared for commercial use, in two different ways, and under the two different relative names of *pot-ash* and *pearl-ash*. The *fossile alkali* in use, is only prepared by one general method; but the particular management of that method, and the different impurity resulting thence, and from the subjects being two

different vegetables, have occasioned also two commercial kinds of it, to wit, *Barillas* and *Kelp*. These, however, not having any immediate relation to the question before us, we shall drop any further notice of them here.

The difference betwixt pot-ash, originally and strictly so called, and pearl-ash, consists in the manner of preparation; the consequential purity, with respect to the being free from the earth of the ashes, or burnt oil of the vegetable; and from the pearl-ash's being rendered more caustic, by a subsequent calcination, which is practised on it.

The principle of difference in the preparation of pot-ash and pearl-ash, consists in this, that the evaporation of the lye, in the case of the pot-ash, is made in an open fire, by throwing it on burning straw, or other such vegetable matter as will flame and make a brisk fire: and that, in the case of the pearl-ash, it is performed in a pot or caldron, by means of exterior heat. Hence it necessarily follows, that the alkaline salt, obtained from the lye, by the evaporation in the open fire, must be mixed with the ashes of the burning vegetables which make the fire, and with some of the most fixed part of the oil or sulphureous matter of the plant; while that, which is obtained by the evaporation made in a pot or caldron, may be kept free from all heterogeneous mixture or impurity. The consequential purity or impurity of the salts, therefore, resulting from this difference in the preparation, make one great variation of the pot-ash and pearl-ash in their marketable value and distinction. But a greater degree of causticity, than is found in alkaline salts that have only undergone the degree of heat, which is to be given thro' the sides of a vessel, where the fire has no immediate access to them, being found to render them more effectual for some oeconomic purposes, the practice of calcining them for some hours, in an oven-like furnace, was introduced for that end; which gave another principle of variation of the pearl-ash from the pot-ash.



It will appear, therefore, on comparing the salt produced by the above process, with the account here given of the preparation of pot-ash, that is not, strictly speaking, a pot-ash, either considered with relation to the mode of preparing it, or to the real contents of its substance. Because the evaporation of the lye is not made in the open fire; and because the salt is not mixed with any calcined earth, or other impurity, as must of course happen in that operation. On the other hand, this salt is not pearl-ash; because it does not undergo the calcination that is used in the preparation of pearl-ash; and which is requisite, in order to give the degree of causticity that is found in the fixed alkaline salt which bears that name.

This kind of vegetable alkali was, nevertheless, that, of which the preparation was most suitable to the circumstances of the American manufacture of it; because it was applicable to all the material purposes of the real pot-ash; and even with much greater advantages in many cases; and being a pure salt, would bear a proportionable price here; and, by that means, save the charge of freight, package, &c. which would have been paid as well on the earthy and impure part of the common pot-ash, which are mere dregs and filth in it, as on the salt itself, which is the only efficacious or essential part.

I have been the more explicit and minute here, because, besides the light which it may throw on the question, how far this matter is practicable here with profit? it exhibits the principles of the process, in a manner that may enable any, who shall be desirous to make such an attempt, to do it with more facility and certainty: and you may conveniently spare that room for it in your *Museum*, which could not be allowed in the Society's premium-book; and thence, indeed, occasioned perspicuity to give way, in some degree, to brevity.

If any attempt were to be made to produce pot-ash, or any vegetable fixed alkaline salt as a commercial article here, it should be the kind prepared by this process. Be-



cause this method of preparation is by much the most expedient, where great quantities of wood-ashes cannot be obtained; and a saving would be made in carriage to London, or wherever it is to be sold or consumed, by the superiority of the price, which is material in the case of commodities brought from inland parts. There will always, moreover, be a staple value of, and certain sale for this kind, which is not the case of the pot-ash prepared in the usual way; as the goodness of such is liable to vary greatly by accidents attendant on the manner of making it: and it is not applicable to many general uses, where a pure fixed alkaline salt is either absolutely required, or at least more profitable, than an impure one that is of lower price. The sale and value of such kind of pot-ash, as might be produced by the practice of this process in Great-Britain, being thus allowed to be certain, the remaining matter to be inquired into, is, whether the materials can be procured here in a sufficient quantity, and at such a price, the rates of labour being also considered, as to supply a manufactory duly; and admit of its being carried on with profit?

As to the possibility of obtaining a sufficient quantity of wood-ashes here for this purpose, it must be granted; as there is, undoubtedly, more thrown away every year, than would yield all the pot-ash, or other fixed alkaline salt, consumed in Great-Britain. But as to the facility of collecting very considerable quantities, at a low rate, without burning wood on purpose, which would never answer the expence, there are great limitations. It is, however, undoubtedly true, that there are many places where wood-ashes are to be had; and, indeed, where they are actually sold at a very low price, less than (as I know the fact to be) some of the American manufacturers of pot-ash have paid for them for that use. Now, therefore, though a large work could not perhaps be thus supplied; yet one sufficient to make it advantageous to such persons as must otherwise be content with very moderate gain, in some other

way, might find enough within the proper distance : and in this, therefore, I join in opinion with your correspondent T. P. With regard to the expence of labour, there is very little required ; as the collecting the ashes makes the principal part of it. For in the immediate operation for preparing the pot-ash, if there were a supply of water at hand, a man and a boy might dispatch a very considerable quantity. In this particular, indeed, it would fail to answer T. P.'s view of employing the idle hands, of which women and girls, in many villages, may be justly accounted a part ; but it would afford something towards their maintenance, if they were paid a small rate for the ashes of their own fires, or those they might fetch or collect from other places, whenever they should bring them to the manufactory. I conceive, therefore, upon the whole, that it is very practicable for some persons living in towns or large villages, where wood is the fuel, to carry on such a manufacture with very good profit ; if they were to make an apparatus, of which the principal expence is an iron caldron, set as above directed, proportioned to the quantity of ashes they could collect ; and were to fix a moderate rate, to be paid to any who would bring the ashes to them : or, in the case of bakers, gentlemen's houses with large families, or other such places, where a considerable quantity is produced, contract for, and fetch them away at convenient times. One such manufactory in every town or large village, burning wood, or probably more in some, might find a reasonable supply of wood-ashes ; and, after the salt is extracted from them, they would, as T. P. properly observes, be nearly as valuable for manure, as they were before : or, perhaps, if mixed with moist dung, or the fluid running from dunghills or stables, answer the purpose better, than when laid crude on land, as is practised at present.

Besides what might be done in a larger manufactory, where a particular apparatus is provided, the method proposed in the above process for private families, using their domestic



domestic utensils, and the ashes produced by themselves, or some of their neighbours, might be equally well practised in villages in England, as in America ; and would, indeed, come nearer to T. P.'s wishes of employing women and children, as the whole might be done by them. But the greatest difficulty, in this case, would be, where to dispose of smaller quantities of such a commodity, when they have made it ? This, indeed, causes an almost insurmountable impediment to this matter at present, unless the proposed attempt was patronized in each place by some person, who could afford to advance the manufacturers small sums from time to time, till they had made a marketable quantity ; which would not fail of producing an immediate return, if sent to proper hands here.

It must be allowed there are reasons of difficulty, but none of impracticability, against the hoping to see the same pot-ash, which is brought from America, produced in considerable quantities here at home. But the principal is, the inattention, or diffidence of success, which these kind of projects meet with from those who are most proper to carry them into execution. Though the present failure of several of our manufactures is likely to send numbers adrift, who must then look about them, and turn their heads and hands to new objects of employment.

It may, perhaps, be objected against what I have advanced, that there is no prospect of success in an undertaking to make pot-ash in Great-Britain, because it has before been attempted, and is either now wholly laid aside, or, at most, carried on in an inconsiderable manner. But to this I answer, that no inference can be drawn from any manufacture of pot-ash ever attempted here, against the probability of success of what is now proposed : the kind of pot-ash produced, and the circumstances of price, &c. at the time when those manufactures were established, being extremely different from what is at present in question. The pot-ash made here was of the coarsest kind, being  
burnt



burnt bean-stalks, straw, &c. with a very small proportion of lye thrown on them; so that the earthy ash, and the fixed oil of the plant, made a great part of their substance. They were employed, on account of certain particular effects, in the making soft-sope, and for some other uses, which are now either discontinued, or found to be answered better by other means. Indeed, the substitution of hard for soft-sope, in almost all common uses of them, has enhanced the value of purer kinds of alkaline salts; and banished, in a great degree, the use of these inferior kinds. The high rate of carriage, so much abated lately by the establishment of turnpikes, was also a considerable impediment to the manufacture of a gross commodity sold at a low price, as was the case of the English pot-ash; whereas, the kind now in question, makes more than a triple return in money, taking weight for weight of each; and the land-carriage is diminished at present in a large proportion. But the greatest variation of the present circumstances from the former, and which alone is sufficient to make such a manufacture very profitable now, as would have been a losing one then, is the late great advance of the price of this kind of commodity, being now almost double: and this alone, when duly considered, takes away all the stress that could be laid on a retrospection to the event of former attempts to make pot-ash in Great-Britain.

I have thus endeavoured to gratify T. P. and yourselves, in your desire of procuring some information with regard to his inquiry on the score of pot-ash. I shall be very glad to find it may prove any way useful to the public, or satisfactory to you; and if any addition or explanation, I can hereafter give, will render it more so, you or your correspondents may command it from me. As I should be very happy in contributing to the saving, at this time, the great sums we pay for pot-ash, pearl-ash, and barillas; which, I am satisfied, there is a probability, might be entirely effected, by the introduction of the manufacture, here, of such pot-ash as is now brought from America, in addition

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to that which is or may be established there ; and by the improvement of the manufacture of kelp ; which would supersede the demand for barillas, and a considerable part of the pearl-ash at present imported.

I am,

GENTLEMEN,

Your humble servant,

R. DOSSIE.



MUSEUM RUSTICUM

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# Museum Rusticum, &c.

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For FEBRUARY, 1766.

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VOLUME the SIXTH.

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NUMBER XII.

*Observations on the present Neglect of planting Trees: And on the Advantages and Means of Culture of the Norfolk-Willow; and other quick-growing Trees.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

**A**MONG all your correspondents, I see scarcely any, who pay a due regard to that species of rural improvement, which seems at present most wanting in our country, while almost every other kind of it is pursued with zeal and ardor. Numbers employ themselves in devising new methods of advancing the art of tillage and pasturage;—in deciding on the merits betwixt the broad-cast and drill husbandry;—in finding out new applications of salads, or other kitchen plants, that before regaled our own species, to the feeding or fattening beasts;—in introducing foreign plants into our fields;—in distinguishing perennial from annual grasses; and, contrary to their natural disposition, making them grow separate;—and, in short, of paying every degree of attention speculatively and practically to the tribe of *herbs*. At the same time

VOL. VI. No. 29.

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there:



there prevails among us an equivalent disregard and neglect of trees, the nobler part of the vegetable creation : those which are now existing in forests, being suffered to stand till they become so superannuated, as to be of no use but to burn ; while those, in other places, are untimely taken off, before they arrive at any valuable maturity : and, in both cases, there is no care taken to provide successors to them. The consumption of wood in every way, is at present greater with us than in any former time : but while we are using it profusely, we make no provision for a supply. The patriotic Society, indeed, seem to keep this object in view : but their premiums are, in general, confined only to such kind of plantations, as are either not at all profitable, or, at most, can be only beneficial to the posterity of those who make them : and therefore only suitable to persons of affluent fortune ; and, even with respect to them, the incitement will hardly go farther, in most instances, than the inducing them to enlarge an avenue, or extend a grove, calculated to enrich the prospect, or render the environs of their mansions more picturesque.

Whence, then, arises this partiality which we entertain, with regard to herbs and trees, in favour of the former ? That, while every body who turn their minds to agriculture, are assiduous in improvements of the one, the other \* should seem almost wholly neglected, though the good of the public renders the contrary necessary. It is worthy considera-

\* There is in general some foundation for what our correspondent here says. But the neglect he complains of is not universal. The Earl of Northumberland begun in the north to give a noble example, by making very large plantations of a great variety of trees, as well of all the forest kinds as others. He has been followed by many persons of fortune, particularly in Northumberland ; insomuch that this part of the country, which was formerly almost destitute of trees, is now finely wooded. Among other instances, Mr. Fenwick has lately obtained a gold medal from the Society for promoting arts, &c. for having planted twenty thousand Scotch firs. It were much to be wished, that this spirit would extend itself into other counties, where there are large tracts of waste land ; which would, by this means, be rendered profitable to the public, and preventive of those inconveniences, our correspondent justly foretels must otherwise in time overtake us, from the scarcity of wood. O.

tion, seriously to inquire into the reasons how this happens; because a right examination into them, may, perhaps, suggest some remedy, at least palliative to the evil.

In the first place, then, vogue or fashion has a very considerable share in this matter. It is now the predominant taste to have a farm, and meddle with husbandry, and drill-culture, lucerne, burnet, &c. are the reigning objects. In the next place, there is some certain return in a short time, from the culture of herbs; and the money laid out does not appear sunk in the same manner as attends the planting of forest-trees: which, perhaps, even at the most distant time, will not yield a competent profit on the necessary expence, unless to gentlemen in very peculiar situations. In the third place, young plantations are very liable to destructive accidents, by the inroads of beasts, the devoration of insects, or the inclemency of weather. And in the last place, being more out of the common track of practice, the culture of trees is much less generally understood than that of herbaceous plants.

The first of these reasons would not probably, from its own nature, be durable; but the second, or want of an earlier return, or perhaps of any profit, even upon the most distant one, is of such a nature, as can hardly be superseded, but by the interference of government; except in the case of a few particulars, who have public spirit, and private ability sufficient to lead them, to support them in such undertakings, as making plantations for the benefit of posterity. The third reason greatly corroborates the second: but by improvements in the art of making cheap and strong fences, the more extensive knowledge of the means of driving off or destroying insects, and the experience of adapting the time and methods of planting to the contingency of season, the disadvantages of this kind may be hereafter greatly diminished. The fourth reason admits of much more adequate remedy, and your work may be rendered greatly instrumental to it. For, if gentlemen, or nursery-men, who are well acquainted with this subject, would communicate their knowledge to you, with respect to each parti-



cular kind in detail, an intelligence in the art of planting trees would be soon diffused among those, who are in a situation to profit by it.

But, after all, much cannot be done towards the inducing great numbers to plant forest-trees, that require a very great length of time to bring them to maturity. What we should principally aim at, therefore, should be, by the planting quick-growing trees which yield an early profit, to save as much as possible those of the other kind from being immaturesly cut down, and to supply the present want of them by such kind of wood, as may be raised without the disadvantages attendant on the culture of the common forest-trees. This is the proper palliative remedy for the scarcity of trees in our country, and would be a very material one if it were duly practised; and it is indeed to be wondered at, that much more is not done towards it already, since the culture of quick-growing trees may be productive of as great profit to the undertakers, as benefit to the public. This is what I intimated by my jocular complaint of the partiality for herbs against trees. For there is really a little inconsistency in the zeal, with which the modern virtuosi in agriculture seem to pursue many objects of much inferior concern, while they wholly neglect this. A little consideration of some very obvious facts will clearly shew the truth of what I advance. There are various kinds of trees, which, when planted in a proper soil, are of very quick growth, and easily propagated from sets or cuttings. This quality of being propagated by sets, takes off not only several years of the primitive growth, but exempts the planter from the danger of those numerous accidents to which seedling plants, and even the seed itself, are exposed. And by choosing such species of trees as soon grow very large, and are yet of a firm texture, and planting the sets in such number, that successive proportions of the whole may be taken up, at different periods, as the trees become incommodious to each other, great gain may be had in a moderate space of time, and an increasing source of property be left, which will conduce to enrich a family hereafter,



after, without any temporary diminution of the trading stock or fortune. The kinds, which may be thus planted, with a prospect of quick return, are several species of willow, particularly that called the Norfolk; fallows; poplars, particularly the Carolina kind; and several others. There is no instance of a more certain and advantageous plantation, than that of the Norfolk-willow, as demonstrated by the late Mr. North, in an appendix to a little treatise on grasses, published by him some years ago \*. As this pamphlet may have reached the hands of but few of your readers, and will, now the author is dead, be scarcely ever republished; and as this part of it is extremely well worth preserving, and illustrates as well the means of doing, as the motives of undertaking, what I have been recommending, I have here sent it to you, and wish you would insert it in-tire; and it may serve as an example of a profitable method of cultivating trees of this kind, that may be applied to several others, also observing a due regard to the difference of circumstances.

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*“ Directions for propagating the Sound-growing Norfolk-  
“ Willow.*

**“ THIS** willow (I dare affirm) will prove very profitable to the planter, and of great utility to the kingdom in general. It will grow taller and larger in

\* We are obliged to Philosylva for this valuable communication, and think it well deserves a place in our collection, notwithstanding it has been before published in the corner of a small work, which scarcely ever found its way into the world, and by the death of its author will be soon lost in oblivion. The facts are not to be denied, and the calculations seem moderate: after admitting which, it must be allowed that a great incitement to the cultivating trees of quick growth is here furnished, and the particular instructions for the management of plantations of this kind, though briefly and simply delivered, are yet very full and clear, and may be of considerable utility to many, who not being acquainted with the practice of planting in this way, nor within the reach of proper assistance, and may yet be willing to engage in such an undertaking. R.

“ twenty or thirty years, than most other sorts of trees will  
“ in sixty or seventy. It grows very kindly, and great  
“ quantities may be propagated at a small expence. A  
“ very considerable profit from it will come to the plan-  
“ ter in five or six years after planting: in eight or ten  
“ years more another profit will arise much larger than the  
“ first; and at last, which will be in about twenty or thir-  
“ ty years after planting, the profit will be surprising, as  
“ I will make it appear in the subsequent account.

“ In order to begin with this willow-plantation, the  
“ land must be securely fenced from all kinds of cattle,  
“ and must be well ploughed or dug in winter, to make  
“ the surface loose, and to kill the grass and weeds. The  
“ season for planting is from November to April, and some-  
“ times later. The driest land should be planted first.

“ One year's shoots are best for sets when they are de-  
“ signed to make large trees. The sets should be cut to  
“ eighteen or twenty inches long; about eight or nine in-  
“ ches of the thick or lower ends must be thrust into the  
“ ground. A strong shoot of one year's growth will fre-  
“ quently make three or four good sets, but I would not  
“ advise cutting any sets from the very tops of the rods,  
“ because they will be too weak to make strong shoots the  
“ first year.

“ The proper distance these sets should be planted, is  
“ about three feet promiscuously. An acre will require  
“ about five thousand. In June, after planting, the sets  
“ should be all looked carefully over: and such, as have  
“ more than one shoot, should be reduced to one, and it  
“ should be minded, to leave the uppermost and strongest.  
“ The superfluous shoots should be cut off close to the set,  
“ that the bark may sooner cover the wound.

“ At the same time the ground should be hoed over to  
“ kill the weeds, and to loosen the surface, in order to  
“ sow turneps, which will no ways hurt the sets, but rather  
“ be of service, provided they are properly hoed, and set  
“ out at good distances, and not suffered to grow within a  
“ foot of the sets. The winter following, when the tur-  
“ neps



“ neps are gone, the ground should be dug all over, and,  
“ the summer after, the weeds cut down with hooks ; which  
“ is the last, and all the labour of cleaning they will ever  
“ want. The best instrument to dig these plantations  
“ with, is the sort of broad-trined fork they use in Kent  
“ to dig their hop grounds. The price, by the acre, is  
“ twelve shillings for once digging.

“ When these sets have grown four or five years, about  
“ three-fourths of them must be dug up, in order to leave  
“ space for the others to thrive. If they have throve well,  
“ in five years they will be above a foot in circumference,  
“ and twenty or thirty feet high. These young trees will  
“ be very proper for many uses, as for chair-makers, hoops,  
“ gates, hop-poles, &c. and will surely be worth three-  
“ pence a piece, upon an average.

“ From five thousand sets which are planted upon an  
“ acre, at about three feet apart, certainly three thousand  
“ may be very properly taken away, and the remaining  
“ ones will not be left quite six feet apart. If these young  
“ trees are valued at but three-pence a piece, they will be  
“ worth thirty-seven pounds, but I rather believe, they  
“ will be worth more. Eight or ten years after the first thin-  
“ ning, three parts in four should again be took up, which  
“ will be about one thousand five hundred ; and five hun-  
“ dred or more will be left at about twelve feet apart,  
“ which should grow twelve or fifteen years longer, when  
“ they will be in fine maturity. The second thinning  
“ will be of much more value than the first ; upon an ave-  
“ rage, no doubt but they will be worth half a crown a  
“ tree at least, as they will be tall and large, and may be  
“ put to divers uses. Many of them will be very proper  
“ for masts for small vessels, as the wood is light and  
“ tough.

“ In twelve or fifteen years more, the remaining five  
“ hundred trees will be very tall and large, perhaps above  
“ sixty feet high, and five or six feet in circumference.  
“ The least value one may conceive must be twenty shil-  
“ lings a tree ; so that, at the lowest profit one can set upon  
“ the



“ the produce of an acre of land, planted with this noble  
“ willow, in about thirty years at most, it will be worth  
“ six hundred pounds, and all the rent, &c. paid, at the  
“ rate of twenty shillings a year. I really think I have  
“ allowed too low prices for the growth, and that it is  
“ very probable they will be worth more. The wood  
“ of this tree is very white and tough, and without pith or  
“ sap; so must be very proper for carvers, turners, &c.  
“ Boards of this wood are as good for floors, or wainscot-  
“ ting common rooms, as any other. I am told, by a  
“ man of great veracity and judgment, that posts of this  
“ wood, set in the ground, will out-last all other sorts, ex-  
“ cept yew, or heart of oak. He also affirms, that there  
“ is no tree upon the earth so proper for ships masts as this,  
“ as it is light and tough, and will not splinter, as fir  
“ does.

“ This tree has oblong, pointed, saw-edged leaves, of  
“ a most refreshing light green: at the bottom of each foot-  
“ stalk grow two small wings, which almost environ the  
“ young shoots.

“ This willow will thrive upon almost any soil, so it be  
“ not too dry.

“ It is also the best kind to plant, in large sets, by the  
“ sides of rills, &c. where they will produce larger lopping,  
“ and in less time than any other sort of willow will do.

“ If any gentlemen, &c. have a mind to make planta-  
“ tions of this profitable tree, it would be well worth their  
“ while to lay out the ground in some gentle meander-  
“ walks; which will be but little extraordinary expence,  
“ and, in few years, will give both shade and shelter.

“ This willow will make the most profitable coppice  
“ woods, to cut every six or eight years, for hop-poles,  
“ and many other very useful purposes.

“ They should at first be planted about two feet and a  
“ half a part; and, after five or six years, three parts in  
“ four should be dug up, and the remainder cut down  
“ within six or eight inches of the ground, to remain for  
“ stubs.

“ This

“ This is also one of the best sorts of willow for basket-makers, as it grows freely, and is very tough.

“ In many countries, where firing is scarce, this willow would turn to great advantage, merely for fuel ; as it will grow into large billets, in three or four years, and will burn very well both green and dry.

“ Since I wrote this, a gentleman told me, that he knew of three willow-trees being sold for fifteen pounds, but he could not inform me what kind they were ; I fancy them to be the *bright swallow-tail willow* ; for, next to the *Norfolk* kind, it is the largest growing sort ; and best for most uses.”

Mr. North calls this the *Norfolk willow* ; but that is only a local name for this tree. It is by some called the *Hertfordshire willow*, and has had various other names in different places. The description he has given of the leaves, and the firm sound texture of the wood, without pith or sap, will, however, sufficiently ascertain the species to those who may not before know it. When he published this account, he advertised, that he would furnish sets to any who might want them. As he is very lately dead, who may be his successors in his business, or whether they will continue to provide for the demand of sets, I am at present ignorant. But it would be a matter of regret, that the difficulty of procuring them, should be any discouragement to those who may be disposed to make plantations of this tree.

There is an addition, which might be made to Mr. North's plan of deriving an intermediate profit from a plantation of these trees, while the principal of them are growing to due maturity. It is this, to leave at the second thinning one tree in the middle of every four, that are intended to grow to maturity ; which middle tree will consequently be at more than six feet distance from any other, being in the diagonal line of the four. The trees so left should be then cut down, within six or eight inches of the ground, and suffered to shoot afterwards as stubs or pollards.



In which state they will afford hop-poles, billets, twigs, for basket-work, &c. if cut at proper periods, from seven years to every other year, respectively to the purposes, for which the shoots may be wanted. This kind of plantation, of pollards, with tall trees, is not so proper in a drier, as in a moist situation; because the crowding the roots may, in dry seasons, injure the growth of the trees intended to stand for wood, where there is a want of moisture in the ground. But in a wet soil it will rather assist than retard them; and will be a constant source of profit during the whole continuance of the plantation.

Other trees may be treated in the same manner, allowing for the respective differences of each, with very great advantage, in swampy and marshy ground, as in the low parts of meadows, or the waste of manors; and the plantations will often prove a beauty and convenience in other respects. In such cases the twenty shillings per year, allowed for rent in Mr. North's account, may be wholly or mostly saved. I could verify the general tenor of what he has alleged, as to the profits of such plantations, from several instances of my own knowledge, where gentlemen have received profit from them in a very unexpected degree. This, when well understood, might furnish very strong inducements to private persons to plant in such a way; and the public would find great benefit in it, by its rendering fuel cheaper: the high price of which, particularly in those places of the more southern parts, which are supplied with coal from the north of England, is now becoming a distress to the poor, and an inconvenience to the rich. Several manufactures, likewise, as well as husbandry, would receive advantages from it, by the cheap provision of wood for many uses. And by keeping down the rates of coppice, as well as forest wood, it would prevent the latter from being immaturesly destroyed by the temptation of the price, for which every kind can in many places be now sold. If what I have said shall, in any degree, contribute to bring about so desirable a consequence, it will be an ample reward for my trouble in this letter; which I leave you at liberty



to insert in your *Museum*, or suppress, as may seem most expedient to you.

I am, Gentlemen, yours, &c.  
PHILOSYLVA.

### N U M B E R XIII.

*Account of a peculiar Method of Tillage, at a Place in the East-Riding of Yorkshire: and an Examination of the Proofs advanced to shew the fatal Effects of Ground-Ivy, when eaten by Horses.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

**I** Think there are few parts of your compilations more useful than accounts of the different kinds of management in the distant parts of the kingdom; especially in tillage; because, such accounts may very probably give rise to the adoption of more reasonable methods than are at present in use in distant parts, where the circumstances are the same as those from which the accounts are drawn. But this track of improvement has not been hit upon; especially, where such peculiarities of management are the result of observation and experience.

I was much pleased, therefore, gentlemen, with an account which I received about six weeks ago, of a peculiar management of tillage at *Market-Weighton* in the East-Riding of this county, given to me by a sensible man of veracity, who was born and bred a farmer in that neighbourhood.

I was then too much affected by the unexpected stroke of my father's death, to take all the notice of his account, which I should have done at most other times; and as he is now removed to some distance, and I cannot conveniently send, for his perusal, the account I am about to give you. Nevertheless, I am persuaded, that I remember all the principal circumstances; and if I, or my informer, be mis-

taken in any material ones, I hope some public-spirited correspondent, in that part of the country, will endeavour to set us right.

The sum of the account, to the best of my remembrance, is as follows: The inhabitants of *Market-Weighton* have five fields, two of a sandy soil, and three of a strong clayey soil; the former, as will easily be conjectured, destined to *rye*, and the others to *wheat*. Their sandy lands are disposed in four swathes breadth; and finding by experience that considerable parts of each land, towards each furrow, are starved by the coldness of the water dripping from the higher parts of the lands, they have for many years altered their former method: and only ploughed the half of each land, *viz.* the two middle swathes: so that they have now *excellent rye* growing on the *higher* and *dryer* half of every land, and *excellent meadow* growing on the *lower* and *wetter* half, which being just two swathes, is mowed with great ease and exactness.

It will, perhaps, gentlemen, be thought by some of your correspondents, that by making *narrower lands*, they might have more dry land, and consequently more corn. But, I apprehend, these industrious husbandmen find by experience, that when they make their lands narrower, and consequently with less descent, the water stagnates in the higher parts, and consequently spoils their whole crop. Nor could they, I suppose, sow more corn on their lands, in their present disposition, with convenience, as their present method allows them just one swathe on each side.

They have *rye* and *meadow* in one of their two sandy fields every other year, and a fallow the next year. The having half of the field in grass, affords good grass for their sheep, &c. in that year; and allows them to keep a good stock thereon; and this stock, in return, manures the ground considerably, both the *fallow* and the *swarth*. One of their wheat-fields affords them plenty of *worse* or *spring corn*; and thus they are supplied with *wheat*, *rye*, *spring corn*, *meadow*, and *summer grass*, from their five fields, which in any other management they could scarcely be.

It

It is observable also, that by this management they only plough as much as four fields, and consequently can afford one-fifth more ploughing to every piece of ground in tillage, than they otherwise could, on supposition that their fields are all of the same extent.

These provident people, gentlemen, have another piece of management well worthy the attention of others. They have two great fairs for sheep; one in *spring*, and the other in *autumn*. They hold the former of these fairs in one of their fallow fields, which is to be ploughed up in spring. The concourse of sheep, horses, &c. manures this field surprisingly, and then they turn in the dung before it be evaporated or baked. Their later fair is held on the other fallow field, which is soon to be sown with hard corn. And here they receive equal benefit.

Whether they have their spring fair on the *rye* or *wheat* field, I know not; but I apprehend them to have it on the former: as *rye* is sown sooner than *wheat*; and the time of sowing might be too late for their autumnal fair.

Whoever, gentlemen, has seen the useless nastiness which is made by sheep at fairs, in the streets of great towns, will think this management of the *Market-Weightoners* highly deserving of imitation; especially in the latter end of the year, when the rains bring in much soil with the sheep.

I would, gentlemen, venture to recommend one improvement to these sensible people, *viz.* after a certain number of years to plough up one of their sandy fields intirely \*, and to cross-plough it, and endeavour to mix the soil of the ridges and furrows thoroughly together, and then to make the furrows where the ridges were, &c. and to sow down the outward swathes of each land with seeds proper to the soil. The advantages hence resulting, are so obvious, that it would be an affront to their understandings to insist upon them.

In

\* There can be no doubt but that cross-ploughing land, where the level admits of it, would be very advantageous in most cases. It not only breaks and mixes the soil of the former ridges more effectually, but renders them much more fertile, by making the new ones consist partly of the fresh and unexhausted earth of the fur-



In your *Museum* for July last, you inserted a letter from your old correspondent *Ruricola Glocestris*, on the *supposed* fatality of ground-ivy to horses. I say the *supposed* fatality of ground-ivy; for that writer had too much modesty boldly to assert it, especially as he advanced no proofs. It is obvious on reflection, that the finding of ground-ivy in the stomach of a dead horse, gives no conclusive argument of the fatality of that herb. For it would prove, in turn, every herb and plant to be fatal to that noble animal, as such herb and plant happened to have been eaten *late*, or the *last* by the animal: whereas, in truth, the cause of the animal's death is often at a distance, and requires much research.

The abounding of ground-ivy, in any *stubble* or *field*, in which an horse sickens and dies, is inconclusive as a proof that the horse dies by such herb; since ground-ivy abounds, in many fields, in which no horse dies or sickens, though he feeds there.

The

furrows. In looser soils, or where the ridges have been laid high, this is more particularly efficacious; for the rain having necessarily washed down the *finest* parts of the earth, as well as the salts formed on the surface, they consequently render the soil in the furrows a rich manure. In places, also, where salt, lime, chalk, wood-ashes, or any saline or earthy manure, or compost, has been employed, the same practice must avail greatly; because there, the salts, and finer earthy particles, must abound in a very considerable degree in the furrows; and, being now brought up to be a part of the ridges, will be dispersed over the other part of them by harrowing, and the diffusion which always happens from rain. It might, perhaps, in some cases, very well answer to spread the loose earth of the furrows, where cross-ploughing is not convenient, by other means, over the ridges, in order to make a more general and effectual mixture of it with that of the ridges; as it would, in proportion to the quantity, be superior to any fresh manure. And it is possible methods might be contrived for this purpose, that would not render it more laborious or expensive than the fertilizing effect would balance. We presume, this notion will, by no means, appear new to some of our readers; but they will excuse us for dwelling on it, as there are many to whom it has probably not occurred in an adequate manner; and the inculcating hints of improvement to some, which are borrowed from others, is one of the principal intentions of our work. R.

The compilers of the *Gentleman's Magazine* have republished, in their collection for *August*, the letter of *Ruricola Glocestris*, in your publication for *July*: and done it *verbatim*, except that they have omitted the address, and have reduced *Ruricola Glocestris* to R. G.

Behold! Gentlemen, in the *Magazine* for *October*, we have a letter addressed to the compilers, and founded on *Ruricola's* letter, as *originally* addressed to them. If the compilers of other *monthly publications* steal your *original* pieces, and thence acquire correspondents who undertake to *illustrate* or *confute* them, it is no wonder, if you cannot always supply your own *monthly publication*, as you proposed to do.

However, I think, you have lost no honour by wanting the correspondence of this anonymous confirmer of *Ruricola's* suggestions. He asserts, that he knows several horses seized as *Ruricola* describes, in stubble fields, in which *ground-ivy* abounded, and that two of them died, and three recovered by use of the *emetic wine*. I have shewn above, that we cannot justly conclude hence, that *ground-ivy* was fatal to any of them; especially since he owns, that “ the “ dead horses were not opened, and therefore the *original* “ cause was not discovered.” What this confirmer of *Ruricola's* hypothesis adds, *viz.* that “ he remembers three “ or four horses seized in the same manner, when *ground-ivy* was in the greatest perfection,” is still more inconclusive; for if we cannot justly conclude this herb's fatality to horses, from their death in fields *where it abounds*, much less can we infer it from their death at a time when it flourishes.

This anonymous gentleman tells his readers, that he will extend his conjectures further, by *supposing* how *ground-ivy* may affect this noble animal, the horse. *Conjectures* and *supposals* are of no worth in such cases as this, when the fact is not *established*. Establish that, and we will thank him for conjectures when absolute proofs cannot be had. Now, gentlemen, this anonymous physiologist's *conjectures* and *supposals*, amount to no more than this, *viz.* that  
ground-



ground-ivy being full on both sides of sharp prickly points, will in the guts plaister itself with *mucus*, so that their natural motion can scarce remove it. Now let any one, who is impartial, examine ground-ivy, and see if he can discover such sharp prickly points as are at all likely to have the effect here ascribed to that plant; and if he still doubts, let him reflect that horses are able to digest the sharp-pointed furze, the sharp-pointed yew, &c. and it will not be in his power to acquiesce in these *precarious conjectures* and *supposals*.

Providence has endowed brutes with the faculty of distinguishing *salutary* from *pernicious* food; and since *ground-ivy* is a most common herb, if it were fatally pernicious to horses, and they were not by instinct restrained from it, it is reasonable to conclude that the species would by this time have been extinct. If any body still thinks, that *ground-ivy* is fatal to horses, he may try the experiment, by giving no other food to some worthless horse, which yet is not in a dying state. If the horse refuses it, he may conclude that nature has given a salutary antipathy to it; if he at last eat it, and die, we may conclude the herb fatal to this animal; but cannot conclude, that other horses, at liberty in open fields to chuse their food, die by it, but rather the contrary, from their innate aversion to it, if such be found.

I am, GENTLEMEN, &c.

Dec. 1, 1765.

THOMAS COMBER.



## NUMBER XIV.

*Observations on the Practicability and Means of producing Silk in England with Profit : in a Letter from Agricola.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

**I**N a letter that I sent you, on the importance of agriculture to Great Britain, and the means of improving it, which you published in your *Museum* for October and November last, I promised to supply you with some observations on various subjects, suitable to your plan; particularly with respect to such articles as the London society for promoting arts, &c. had adopted, or should hereafter adopt, as objects of their consideration or encouragement. I have already made good part of that promise; and I here perform a further part of it, and give you my sentiments on a subject with regard to which, though that Society has not offered any premium, nor taken any other public measure, they have yet shown their desire of promoting it: and their belief of a possibility of success, by a private act \* of approbation and reward done to a gentleman,

\* The circumstance I allude to, with relation to the Society, is this. A gentleman, who signed his name *Rusticus*, sent, from the country, some skaines of raw silk of his own production. They were referred to a committee, who gave it as their opinion, in a resolution, "that it appeared, the worms had not been well managed, nor the silk well reeled: but, that otherwise, the silk would have been equal to the best foreign." On a discussion, which of course then occurred, on the question, whether the producing silk in quantity, was an attainable matter in this country, the committee were so much induced to believe the affirmative, as well from conclusions drawn from relative facts, as from the opinion of a gentleman, whose great good sense and probity, together with a consummate experience, as well as speculative knowledge, of every thing regarding the matter, made him a very respectable authority. And in consequence of

man, who sent to them some proofs at least of his spirit and inclination, to set the example of a bold attempt in the matter.

The article I mean is, THE PRODUCTION OF SILK IN ENGLAND: which, could it be effected, so as to furnish the whole, or great part of what we now consume, would, perhaps, be more advantageous to the community, than any other subject whatever, of produce or manufacture. And there is great reason to believe, as well from the authority of the best judges, as from conclusions drawn from the circumstances of the thing itself, that it is far from being impracticable.

As the production of silk at home does not, however, seem to be attended to at present, in the degree, I conceive, it merits, it is my intention here, to set both the utility and practicability of it in a just and full light: the first step towards the establishment of any undertaking, which requires numbers, being to incite numbers to attempt it.

In examining into the importance of producing raw silk in Great Britain, we must consider it, as a commodity we at present wholly purchase of foreigners: as one, of which we so purchase to an extreme great amount, that lies almost entirely against us in the balance of trade with the countries of whom we take it:—as one, the price of which is now so high, as to bring the most perplexing distress on our manufacture of wrought silk, by the temptation it gives to the contraband importation of that of the French, an evil, which must continue unless some extraordinary remedy be found for it:—and as one, of which the future supply is precarious, and may so fail, as to occasion hereafter the absolute ruin of our manufactories of wrought silk. The prohibition of the exportation

this opinion, they recommended it to the Society, to make the gentleman, who sent the specimen of silk, a present of a reel and bason, made in the manner of those used in Piedmont, together with Mr. Pullen's book of instructions for the management of worms and raw silk: as a mark of their approbation of his attempt, and an encouragement to him to persevere in it. Agricola.



of this article from China, whence we before obtained part of what we use, which has had a great effect on the general price of silk here, evinces the ground there is for the last of these considerations, as the same, or other causes, may, from various events, deprive us of the resources we yet have for the procuring what we want. The rest of the considerations are founded on such notorious facts, as render any proof of, or argument for their truth unnecessary; and take away all occasion to expatiate further on the matter in this view.

There is, nevertheless, another principle of equally interesting consequence, from whence the importance of producing silk in England may be deduced. This is, the employment it may afford to *idle hands*, and the distressed poor. To judge properly of the extent of this benefit, it is requisite to enquire into two points: how many and what sort of persons these hands would be. As to the first of these points, or how many people might be employed in the business relative to the production of silk: could the matter be at all carried on with profit to the undertakers, the number of hands that might be enlarged in the various offices of tending the worms, and winding the silk, would be extremely great; far beyond what those of any other manufacture or culture could equal. As to the second point, or what kind of persons might be proper for this work: it would happily be, for the most part, *women and children*, whose present idle and unemployed state is not less the source of vice, than it is of misery. This is a consideration of the most moment to our country in its present situation, of any other whatever. Since to establish the habit of industry in females, and the youth of both sexes, is the only means to check the growth of that licentiousness and depravity of manners in the lower people, which seems to threaten the destruction of all civil order among us. Nothing can more conduce to reform, as well as to enrich Great Britain, than the finding out the means of settling to work all the idle youth, women, and poor of both sexes.



In every light, the introduction of this most valuable produce, appears of such consequence to us, as renders it highly worthy the disquisition, how far there is a probability the obtaining it could be effected. In order to this, it is proper to examine into four several circumstances, the right concurrence of all which is, indispenfibly, requisite. The first is, *whether the climate of this country will agree sufficiently well with the silk-worms, to admit of their being duly propagated, and preserved while they are making the silk*: the second, *whether the proper food can here be provided for them*: the third, *whether the present rate of labour and other attendant charges, would not raise the expence of producing the silk beyond the due bounds*: and the fourth, *whether the knowledge necessary to the performing this matter, as a practical art, is to be obtained here by those who may be disposed to attempt it*. To some, or all of these circumstances, the objections must relate, which are brought against the practicability of our producing raw silk with profit: and I shall, therefore, consider them separately, in order to weigh more justly the force of what is alledged with regard to each.

As to the first circumstance, that is, *whether the climate of this country will agree sufficiently well with the worms, to admit of their being duly propagated and preserved, till they have made the silk*: the negative of it has been generally supposed; and offered as a principal reason against the practicability of our producing silk with profit. But this notion does not appear to be well founded, when the facts, which juster observations and experience in the right method of treating the worms, have brought to light, are well attended to. It is true, that if the same method, with relation to the time of hatching the eggs, &c. was pursued here as in the more southern countries, destructive accidents would frequently occur: but it is now well understood how to retard the hatching, &c. and keep back the otherwise too forward vital progress of this animal through its several stages, to accommodate it to the peculiar circumstances of this climate: by which the hazard

hazard may be avoided. And if it be said, that, after all, moist hot weather will sometimes kill the worms, the same may be affirmed in a greater degree of the strong heat in Piedmont, Lombardy, and other parts of Italy; so that the argument deduced from this fact, would prove too much; since it would equally or more forcibly operate against the practicability of producing silk in those countries, where it actually is produced in the greatest quantities. These tender animals suffer in every climate from unfavourable weather; and more generally in some seasons in the southern countries than with us, provided we use the due precautions; but this is a disadvantage and not a total obstacle to the production of silk with profit, as we see by the absolute fact itself. The principal ground of this opinion, of the unsuitness of our climate for producing silk, arose from the improper treatment of the worms here; owing to the ignorance of a better method; as trials made in a more judicious manner, have experimentally shewn.

As to the second circumstance, or *whether the proper food can be provided for silk-worms here*: it has also been denied, but with less foundation than the forgoing. The mulberry-tree, particularly the black kind, the leaves of which are the food of silk-worms, flourishes as well, and is as hardy here as most other trees; and the white kind, though somewhat more tender, is yet easily cultivated even by sets or cuttings. But the black affords, in general cases, as proper food for the silk-worm, as the white; and is indeed, in some silk countries, the kind in common use. There is, however, an advantage in intermixing some of the white, which is, that the buds open earlier, and the leaves are tenderer, and consequently furnish food for the young worms sooner, and more kindly to them, than the black. As these trees can, therefore, be easily propagated in any number, here as well as elsewhere, even from cuttings, there can be no want of means of producing food for the worms, and at the same expence, as in other places. It must be allowed indeed, these trees come into leaf later



later here, and consequently do not afford the food so soon as in the southern countries, but the progress of the worm to the state, which renders it necessary, may, as I observed above, be correspondently retarded, and then this objection ceases. There is, moreover, one circumstance peculiarly favourable to us in this point: which is, that the leaves of the mulberry-tree never blight here after the buds are opened: an accident to which they are greatly subject in some of the parts of Europe, where most silk is produced, to the great embarrassment of those concerned in it. In this particular of the provision of food for silkworms, we stand therefore on at least as good a footing as any of our rivals in it: and consequently no just objection can lie on this head.

As to the third circumstance, *whether the present rate of labour, and other attendant charges, would not raise the expence of producing the silk beyond the due bounds*; it must be admitted, that the whole stress of uncertainty must rest here, and that it is not so easily to be cleared up, as in the other three points. It is by no means, however, evident, that the price of labour would be an invincible impediment to the produce of silk, if we consider, that the far greatest part of the work may be done by women and children, and some of it even by persons aged and infirm. And as, in a great many towns and villages, numbers of hands of this kind, are at present wholly unemployed, they could afford to work at very low rates, and yet with great advantage to themselves. For where persons, whose strength, either in consequence of youth, old age, disease, or want of habit of working, are not fit for common labour, and lie a dead weight on their families or parishes, every constant aid becomes of great consequence to their comfortable and better support. The argument drawn from the high rate of labour does not, therefore, hold good, with respect to undertakings, where those are to be employed, who earn nothing at present: because the price of such labour cannot be taken into the comparison, in this view, betwixt country and country,



country, as it has in fact no price any where, and this principle is most manifestly verified, by experience at Birmingham. In that town, great numbers of women, children, and infirm persons, even most of those in the parish work-house, having been engaged in the manufactures, the undertakers have reduced to a surprizing degree the price of every article they have taken in hand. The people of Geneva, one of the cheapest and most industrious places of Europe, were beat by them out of the manufacture of enameled toys, which they had for a long time monopolized: the founding, gilding, and laquering ornamental articles in metal, have been carried by them over all other places in a most extraordinary manner, and proves that where waste hands are employed, the common high rate of labour in the country becomes no obstacle to the establishment of any manufacture. That there is not any want of such hands in most places of Great Britain, is too regretfully obvious; and that they may, by proper degrees, be brought to work, where opportunity, example, and encouragement are duly given, is evident from the instance of the town here mentioned. The argument, therefore, from the great price of labour in England, against the production of raw silk, however specious, on a slighter view, seems to vanish, when these particulars are brought into consideration: and perhaps, the dearth of all the necessaries of life, which tend to the injury of those manufactures, where strong and able hands only can be employed, may, in a short time, conduce to the promoting those, which may be carried on by the weak, and less able: as distress is the most fertile parent of industry, and even women and children, though habituated to sloth, may be brought to work, when they can no longer find the means of eating without it. Though there are, indeed, too many instances, in some counties, which show, that the habit of idleness is proof against nakedness. Mr. Pullen in his ingenious treatise, of which it will occur to take further notice below, says, that “ he takes it for granted the culture of silk-worms cannot  
“ be

“ be performed by the lower class of people.” But he explains, that he only means, they cannot be undertakers of it, because the worms require proper rooms, fires, mulberry-trees, &c. But this by no means makes against their being employed by those who have skill to direct them; and a very moderate fund to provide these conveniencies. As to the other attendant charges, they would, in a large concern, be very moderate. A plantation of three thousand mulberry-trees, which might occupy three acres of ground when in maturity, or in proportion while they are younger, would provide for as many worms, as would produce in silk of good quality, twelve hundred pounds sterling in value or upwards. The rest, beside the labour, would be slight buildings, fire, stands, basons set in brick-work, reels, and some other trifling implements. But I cannot give a juster view of the small compass, the whole might be reduced to, than by quoting Mr. Pullen’s observation on this point: who says: “ When it can  
 “ be shewed, that two or three large mulberry-trees, or  
 “ a proportional number of small ones, will feed a  
 “ sufficient number of worms to make a pound of silk:  
 “ that the stand, which holds these worms, will not take  
 “ up a yard space in a room: that one person, skilled  
 “ in reeling, can, with the help of a boy to turn the  
 “ reel, wind off two or three pounds of silk in a day:  
 “ that one pound of this silk will make near five yards of  
 “ padusoy: that the whole time, from the hatching of the  
 “ eggs to the reeling of the silk, amounts to no more  
 “ than six weeks: that a small part of each day is sufficient for the proper attendance: and that, besides all  
 “ this, it can be done with much less trouble than is  
 “ generally undergone. These things, I say, being considered, and, as I hope, shewn in the progress of the  
 “ instructions given in this book, then the managing of  
 “ the silk-worm will appear in a more inviting light, and  
 “ be looked upon as an entertainment, neither unpleasing  
 “ nor unprofitable ”

This



This may serve to give a general view, how easy and moderate the expence of labour, &c. would be, if women and children were employed in a large manufacture of raw silk; and how small the other disbursements would be in proportion to the return: so that, perhaps, there is no undertaking of equal consequence and extent, which could be carried on with a more moderate capital than this.

As to the fourth circumstance, or *whether the knowledge necessary to the performing this matter, as a practical art, is to be obtained here by those, who may be disposed to make such an attempt*, it may be now safely answered in the affirmative, though till lately great difficulties arose on this head; as neither the art of breeding and managing the worms, in a manner suitable to this climate, nor that of winding off or reeling the silk, were well understood. But at present the proper treatment of the worms is well known; and not only models of the reel used in Piedmont, the best hitherto brought into practice, are to be easily obtained: but Mr. Pullen has constructed a very good one, different from what are in use elsewhere, and very well adapted to the purpose. He has, also, published a treatise on this subject, where all the principles are well inculcated, and many just instructions given for performing the particular offices, both with regard to the treatment of the worms, and the cocoons or silk balls. It must, indeed, be allowed, that some of the methods he teaches, are rather accommodated to the pursuit of this matter as an amusement, than as an article of commerce; such as hatching the eggs in the bosoms of living persons, the keeping them in bed-chambers, and the killing the worms by the heat of the sun, or the steam of water; all which, together with the preservation of a due heat and dryness in the room, where the worms are to inhabit, might be performed by stoves regulated by thermometers, in large manufactories; but this will be easily allowed for by those, who study his book, with a view to applying it to practice in large. This treatise, therefore, if well understood, will furnish sufficient know-

VOL. VI. No. 29. O ledge



ledge to any intelligent person, to begin this work, as to the management of the trees, worms and filk ; and the Society for the promoting arts, &c. have, in their possession, both one of Mr. Pullen's, and one of the Piedmont reels, by which any person may, on application, have either kind made. And I doubt not, gentlemen, but that your *Museum* will be an open channel of communication, to the displaying or removing any difficulties that shall offer to such as may engage in this work : as I know some gentlemen, who are extremely well versed in the matter, that will be very ready to lend their aid, by furnishing all the requisite information, to any who shall publickly call upon them for it.

The practicability of producing filk in Great Britain with profit to the undertakers, may therefore be very reasonably presumed, from what has been here advanced. But it must be acknowledged there are some difficulties which stand in the way of our expectation, that we shall soon see the matter accomplished.

In the first place, though it is the poorest people, who must be employed in this undertaking, as to the actual labour, yet it is by no means they, who must begin it. A capital is wanting ; and also a liberal turn of mind and docility, not belonging to the lowest class of people, to learn a new art, and conduct the several parts of it, till it is so established, that imitation may afterwards be a sufficient guide. A plantation of mulberry-trees is first requisite, after that, proper buildings, with the utensils, and other apparatus for breeding, feeding and preserving the worms, and for winding the filk. For though, after the establishment of several large manufactories of this kind, the production of the cocoons or filk balls, and the winding of the filk, may be separate undertakings ; yet in the infancy of an attempt to produce raw filk, and indeed, till considerable quantities of cocoons are produced in the same neighbourhood, they must be carried on conjointly. It is necessary, likewise, that some sagacious, sensible person enterprize the superintendance and direction

of such a work, till the inferior hands are rendered capable of acquitting themselves well in their respective office ; and that extraordinary attendance and care be observed, till both the skill of performing properly, and habit of attending diligently, are acquired, by all who are concerned in the management of the worms ; but, if a number of persons were once duly initiated into the knowledge, and habituated to the practice, they would soon be capable of leading and teaching others.

The reasons here advanced, for the practicability of producing silk in Great Britain, are founded on the suppositions, that the methods now practised are to be pursued. But a much more favourable prospect of success presents itself, when it is understood, that very great improvements may be made, in every part of this art, which regards the treatment of the worms, on principles that are incontestable. In large concerns, all the disadvantages, arising from change of weather, may be totally removed, and the destruction of the worms, from that cause, much more effectually provided against, than they can in hot countries. Since it is much more practicable to procure a due degree of constant equal heat in colder climates, than to prevent too great a one in hotter. By means of tin pipes, diffusing the most regular heat from stoves, and of proper ventilators, the air may be always kept of an exact temperature, and yet continually changed at discretion, so that neither cold, moisture, nor stagnation, may affect the worms : and this may be done with a small comparative expence, either with regard to the construction of the apparatus, or provision of fuel. The hatching, and killing the worms, may, in like manner, be performed by stoves, with much greater ease and certainty, than by any of the methods usually practised. By the same means, it is also practicable, to have a second product from the same breed in one season ; as well here, as in the southern countries : an advantage never hitherto brought into consideration by those, who have taken their notions only from a view of the present methods, and the

accidents attendant on the natural state of the air in our climate. The certainty with which I speak of a second product the same year, is not the result of speculation only; but of positive information. For a gentleman of unquestionable veracity, who resided some time in China, and was at a considerable expence in diving into all the mysteries of the Chinese methods of the treatment of the silk-worms, even so as to procure operators from a distant part of the country, to perform the whole in his own house; assured me, that they had the art to breed, hatch, and set to work the worms, as many times repeatedly in the year, as they chose, allowing the due time for the progression from the new-laid eggs, to the time of breeding in each succession. This gentleman is now abroad; but he told me, before he went, that he had communicated the whole of the Chinese method, to a very great personage, in order to its being rendered of public utility. It is, therefore, to be hoped, the particulars will in due time be laid open, and some lights thence gained, that may conduce to the further improvement of this art. The great perfection to which the construction of close stoves, conductory warming pipes, and ventilators of every size, is now brought, renders the application of proper heat to any of the purposes, respecting the management of silk-worms, much more easily and accurately practicable than it would have been formerly: and the improvements of the reel, and the methods of winding off the silk, equally facilitate that part of the work to those who are to learn it.

From a just view of all these circumstances, it may be reasonably inferred, that there is no natural nor economical cause of impediment to the production of raw silk in Great Britain, as an article of commerce, and that the importance of such an undertaking is, as above observed, so great, as to merit every public and private encouragement. It may, nevertheless, be objected by some, that this article should be left to North America, where the government has appointed aids for it, and where some beginnings have



have been actually made. But to this, I answer, that the very slow progress, or rather the present retrograde state of the undertakings there, though pushed forwards by very extraordinary encouragements, as well from the London society for promoting arts, as the government: who, besides the giving a large bounty, have erected a public filature, shew the great difficulties they labour under; and the little prospect there is, that the consumption at home should be provided for from this quarter. Indeed, it seems very apparent that this concern is not suited to colonies, where there is necessarily a want of those unemployed hands, which are alone proper to be employed in it. The number of those poor families, where the women and children live on the earning of one man, paid only as a mere labourer, are very few in such places, compared to what they are with us: and yet the work must be done by such women and children, to put the undertaking on a footing with those of other countries, whence we now take the raw silk, where this is entirely the case. If America, therefore, has some advantage in the warmth of the climate, an advantage, perhaps, that does not avail over a proper use of stoves and ventilators, as above intimated; yet in this other point, of being provided with proper hands, we have an infinitely greater advantage over them: and there can be no reason we should neglect or sacrifice it to the speculation of serving them, in a matter where the event is so precarious. It would be a great length of time before they could find hands, should they succeed at all in this attempt, to produce the great quantity of raw silk we use in our manufactures, which is indeed sufficiently large to find work for very great undertakings both there and here. And there is no reason of policy, why we, in a matter which may be so properly considered in the light of a manufacture, should give them the preference.

I have thus endeavoured to evince the reasonableness of the opinion, that the producing raw silk with profit in England, is practicable: and to point out the great ad-

van-

vantages of it. I hope it may induce some of your public-spirited readers, to turn their mind towards it, for the good of their country, and the benefit of their estates. For certainly there are many estates, where the cottagers, and poor inhabitants in the neighbourhood, who are, in their present condition, a load and embarrassment, might, by being thus employed, become a benefit and convenience. To any who shall be disposed to promote this matter, the Society for the encouragement of arts, &c. have shewn they are ready to afford assistance: and I make no doubt, gentlemen, but that you will make your work the channel of communication for any thing that may conduce to the same end: and that, more particularly, you will give this a place in the next number you publish: which will oblige

Your humble servant,

AGRICOLA.

## NUMBER XV.

*Answer to Mechanicus's Queries concerning the Management of his Farm; and Reflections on the Expedience and Means of improving public Roads, particularly those which are not turnpike: In two Letters to the Editors from Mago.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

**I** KNOW not if we agree, but I think, I have worked very hard for you; indeed, I begin to be tired, and was forced to set a young man to copy over the inclosed long letter; but as I thought it would be acceptable to you and the public, I got it done. As to the other, I think it will be very serviceable to Mechanicus, and really he appears so very deserving, from his manner of writing, that I could not withstand his requests.

I wish

I wish some one of you would call at a farmer's, and look at a cutting-box, you will find that all its parts are not described yet, they have omitted a most material one, viz. the *rake* that moves the straw, &c. forward to be cut. Lengthening the handle will be of little or no service, as the cut is nearly up and down. Two knives cannot work, much less three. The straw would give way before them. I wonder, Mr. Comber, who is a sensible man, would venture to write so much of an instrument, he now owns he never saw or heard of : and the Merchant knows little or nothing of the matter ; tho' I could not help laughing at Mr. Comber's recommendation of his contrivance to a Scotch gentleman, because it was like the *Scotch Maiden*. My good wishes always attend you.

I am, GENTLEMEN,

Feb. 8, 1766.

Your humble servant,

MAGO.

*Answers to Mechanicus's Queries concerning his Farm.*

GENTLEMEN,

THERE is nothing gives me more pleasure, than the being as serviceable as I possibly can ; and, therefore, since you have given a place to a letter from Mechanicus, p. 289 of last Volume, in which he desires my advice relative to his little farm, I shall readily comply with his request ; tho', as you justly observe in your note, it is more a matter of common practice, than such as properly comes within the province of the *Museum* : yet as what I have heretofore said on this subject, in my letters to Mr. Scott\*, and what I may now add in answer to Mechanicus, will fully answer all such questions, unless

\* Vide Vol. IV. p. 319. and Vol. V. p. 195.

some



some abler pen comes forth in the cause ; so I the more readily comply with the present request.

I cannot help observing here, how strangely parents sometimes act in the disposal of their children in this world. How improperly does Mechanicus appear to be placed ? Had a person of his genius and abilities been brought up a farmer, it might have been greatly to his own advantage, as well as his country's : yet we find he was put to a laborious trade, to which even his very constitution was not adapted. Be wiser, therefore, O my countrymen ! and consult not only the genius and disposition, but likewise the constitution of your children in the disposal of them in life.

Mechanicus has given rather an imperfect account of his land ; however, he says, it is mostly indifferent, covered with docks and thistles ; and that the land is light, naturally wet, and poachy. The best advice I can give him, is to get rid of his farm as soon as he can. For, he says, he pays eighteen shillings per acre for it, when his neighbours in general pay only nine shillings ; if he can't get rid of it, he must endeavour to get his landlord to contribute to the expence of improving it ; or grant him a longer lease.

If I understand Mechanicus right, he has only one arable field, of three acres, the rest being grass land, and all of it over-run with docks and thistles. Under these circumstances, his first business is to scour out his ditches, to sink them deeper than they were before, and to give all possible vent to the water. After doing this, I would advise him to make stone drains in those fields that seem most to require it : and to lead those drains into his ditches. This will be a great improvement to his land \*. For, from being wet and poachy, as he describes it, it will soon acquire a proper degree of solidity : and this is

\* It appears to me, that Mr. Randall's new-invented drain-plough must be a very useful instrument in this case

MAGG.  
absolutely

absolutely necessary in order to its being laid down to grass: for cattle unavoidably do great mischief to grass land, when it is so wet as to poach. From draining his land in this manner, he will reap another great advantage: which is, that he will be able to plough much earlier in the spring, than he otherwise could do: and further, his land will be prepared to receive greater benefit from the marl; which, to land naturally light, when the water is discharged from it, will certainly be a great improvement. The marl should be laid on, in the autumn and winter seasons, from thirty to sixty loads or upwards per acre; as he has time and opportunity. A gentleman, in my neighbourhood, has this winter marled an eight-acre field at the rate of one hundred and fifty loads (a three-horse draught) per acre. The land is a hot gravel; and there can be no doubt but it will be a vast improvement to it.

Mechanicus's land, being over-run with docks and thistles, must be kept under the plough till they are extirpated. Therefore, crops that require, or are improved by horse-hoeing, will be much the most proper: and the frequent ploughings and horse-hoeings will, at the same time, that they destroy the weeds, incorporate the marl or clay with the natural soil: and bring it to a fine rich mould.

When the land is brought to the state above described; which may be done in a year and a half, or two years, it may then be laid down to grass: and, for the methods of doing this, I refer to my letters to Mr. Scott: and to what has been said on the subject, by my worthy neighbour, Philogramen\*.

The soil which comes from scouring the ditches, should be carried to a compost dunghill, which for this land should consist of such ditch scourings, marl or clay, dung, lime, &c. Timothy grass, from what I know of it, seems best adapted to land that cannot be drained; if it can, I think there are better grasses.

\* See Vol. V. p. 161.

I should be glad that Mechanicus would allow me to recommend to him Mills's New System of Husbandry; a person, of his genius, will find great entertainment and instruction in the matters he inquires after, especially in the first and third volumes.

I had wrote the above a few days after I had read Mechanicus's first letter, Vol. V. p. 289, when, hoping that some gentleman, more able than myself, would give him the assistance he desired, I laid the paper by; but finding, in your last Number, p. 40, that he again calls on me, I could not any longer delay endeavouring to assist him. During the time that Mechanicus is employed in draining, bringing his land into good tilth, and extirpating the weeds, I agree with Philomath, p. 33, in advising him to cultivate some of the best grasses in drills, in order to supply himself with seed, to lay his land down with. A gentleman of my acquaintance has a small field, of near an acre, which is laid out with several grasses, as flete fescue, vernal, foxtail, crested dogs-tail, great and annual meadow, oat grass, &c. &c. they are sown in drills at about a foot apart; and he thus collects, every year, large quantities of very fine clean seed, from the best grasses, free from weeds of every kind, as the intermediate spaces are hoed whenever they require it.

I have no doubt, but that a great reformation will be made in a few years, in our meadow and grass grounds, by following this method of cultivating grasses; for gentlemen will naturally be lead to gather the seeds of any grass which they find thrives most on their particular soil, and sow a few drills in their gardens; by this means they may soon be greatly encreased, if they are found to answer. Drills formed in this manner, I would recommend to be sown the latter end of July, or beginning of August, as they may be easily assisted with a little water if no rain fall; and the grass, by so doing, will be much forwarded in its growth.

Mechanicus may make a summer fallow, or take off a horse-hoeing crop as he pleases. I advised the latter to  
Mr.



Mr Scott, as being most profitable; but when lands work in great clods \*, as Philomath mentions, p. 33, it will be very imprudent to sow it with grass or any other seed. Mechanicus will certainly have the prudence to bring it into good tilth, before he sows it. I can have no idea of laying down land with natural grass in drills: and Philomath destroys the very end of such sowing, by directing Dutch clover to be sown over it in the spring following.

Philomath seems to set light by marl: and “thinks that a summer fallow will intirely answer the end, and at the same time *greatly lighten* the ground.” Now, it appears to me, that he has forgot Mechanicus says his land is *light*, as well as wet and poachy. The latter makes draining necessary, if practicable, this will make the land lighter: and to which, good ploughing and horsehoeing, will still add; so that there can be no doubt, but that marl or clay, will be a great improvement to such land.

I hope, what I have now said will be serviceable, and satisfactory to Mechanicus. I shall be glad to know the success that attends it; and it would also give me pleasure

\* Strong clays very commonly work in this manner. I spent a day last summer with a gentleman who holds about one hundred acres in his own hands, the land is a very stubborn clay. A field of ten acres had been ploughed the day before, and lay like the ruins of a great city: Randal's spiky roller was at work upon the field when I was there, it went twice or three times in a place, as the clods required; a plough followed the roller; and when the roller had gone over the field, and came in turn to follow the plough, it was really surprising to see the effect it had on the land. From a heap of ruins, it was reduced to fine mould. I think too much cannot be said in praise of this instrument upon clay lands. My friend said, it cost him eight or nine guineas. I wish, every farmer on clay land would buy one; and I wish, every gentleman of fortune, who is desirous of encouraging an industrious farmer on such land, would make him a present of one. Where a pollard oak, and shafts can be cut, on the farm, the expence must be much less. MAGO.

to hear Mr. Scott's success. I think he owes me, and the *Museum Rusticum*, that acknowledgement.

I am, GENTLEMEN,

Feb. 5, 1766.

Your most obedient servant,

MAGO.

*Expedience and Means of improving public Roads.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

**I**N a country dependant on trade, like Great Britain, too much attention cannot be paid to its public roads: nor do I mean merely those roads only which are regulated by particular acts of parliament, and are known as turnpike roads; but also those, which are under the direction of general acts, and distinguished as parish roads. It must be needless to repeat here, the advantages that arise from good roads, as they are numerous and evident: I will, therefore, only observe, that on them depend the carrying manure to the land, by less strength, and more expedition, and the conveying the produce of those lands to distant markets. A moment's reflection will consequently shew the advantages of good roads through the kingdom, to agriculture and trade: for, if we wish to see our manufactures thrive, we must supply those who are employed in them with provisions, on the most reasonable terms, and as they encrease, the demand for provisions will encrease also; thus trade and agriculture will ever go hand in hand.

I have often been surprized, at the little attention given by gentlemen of fortune and liberal education, to the roads in this kingdom. Great improvements, I admit, have been made of late years in the turnpike roads, tho' I think there is yet room for much greater; but the parish roads are generally neglected. The surveyors there, are mostly the lower farmers and tradesmen, who know no more of constructing a public road, than they do of Euclid. This leads me to reflect, on the vicissitudes of things in this world.



world. How strangely do fashions alter ! A surveyor of the roads, *ex officio*, is a very contemptible person in our days ; but among the Romans, it was an office of the highest esteem ; the greatest men among them thought it an honour. Thus we find, Cæsar was surveyor of the famous Appian road or way ; Turtullus of the Æmilian road ; and Pliny of the Tiber and its banks. Let me flatter myself, therefore, that, in this age of enquiry and improvement, gentlemen of property will more and more interest themselves in a matter of so much importance to their country, as this branch of civil enquiry will appear to be upon a little reflection.

In order to induce gentlemen, who are inclined to serve their country in this matter, I will enter a little further upon the subject, as to the methods generally followed in the construction of public roads. First, they may be laid in an undulated or waved form, with an even surface, so that the wheels press equally on every part of the road. Secondly, in an undulated form, with a convex surface. And thirdly, in a straight line greatly convex. The last is more proper for turnpike roads, where there is ample width ; as in that beautiful road, called the city new road, which is constructed upon this principle. But the other two are more proper for parish roads, which are generally narrow ; and in them, if there be room for two carriages, it is sufficient : though care should always be taken, that there be such width.

Parish roads, are not narrow, but generally speaking, more confined, as to the sun and air, than the turnpike roads : and, therefore, I recommend the undulated form for them : and if they be made somewhat convex, or full and round in the middle, I think it the best form they can be laid in. But, in making or mending a road, public or private, the first thing is to get rid of the water. This must by no means be omitted ; it is the greatest enemy you can meet with, and must be conquered. The farmers, whose land adjoins to the roads, are often very negligent in this respect : but you have an act to assist you, which says, “ all  
“ persons



“ persons occupying land adjoining to the highways, shall  
 “ scour out their ditches, gutters, and drains: and all  
 “ persons having land adjoining to the grounds so adjoining  
 “ to the highways, where any ditching or scouring  
 “ ought to be, are forthwith to scour their ditches so adjoining,  
 “ that the water conveyed from the highway may  
 “ have free passage over the said grounds so next adjoining.”  
 This act must be put in force, without favour or affection to any.

Be assured it is not gravel alone, that will make a good road, let the quantity laid on be ever so great. On the contrary, the whole depends on the manner in which the roads are constructed; and the free vent for the water in the vallies or intermediate spaces. For, I am convinced, that one hundred load of gravel will be of more real service, when properly made use of, than five hundred, laid on by a person unacquainted with the construction of a road. Since if the road lies in such manner, that it cannot vent the water, it will be in the same state, as a stone under the hands of a stone-cutter, who, being supplied with sand, and a small rill of water, will, by means of the friction from his saw, soon work through the largest stones.

From hence it is plain, that a flat or level line is the most improper form for a public road: and that an undulated and somewhat convex line, is very proper for a narrow one. Indeed, there are some roads about London, which are laid, or rather *pretended* to be laid, in this manner; but the waves are so low, and so bounded on the sides by dirt and rubbish, that they are more like a great gutter than a road: and, therefore, generally in the winter season, in a very deep and dirty condition.

Roads that are now flat, may very easily be waved, by sinking the ground for ten, fifteen, or twenty yards: and dividing the earth each way to the center of the intermediate space undug; by which means, they will be waved with ease. The work should be done in the spring, when the dry weather comes on, and graveled in the summer, by which method a road will be made, that with little attendance, will last many years.

I must now beg leave to say a word or two in regard to *gravel*; which, I think, in many places, the surveyors of the roads, both public and private, are at a needless expence in screening. I do not doubt, but many of them would prick up their ears at hearing this. I would not have them however be too much surprized. I must first desire a little chat with them upon the subject. For I not only look on it as a needless expence; but in many places a detriment to the roads. Providence, who kindly gave us this material for valuable purposes, does not leave its works for us to mend. Gravel, in most places, is a hard compact body, composed of small stones so fixed in, or bound together, by a kind of bituminous matter, that it is with great difficulty the labourers work into it. Now, by screening, this cement or bituminous matter is separated from it: and the remainder is nothing, but a parcel of small stones, which being laid on the roads, neither do, nor can fix or bind, till by the frequent passing of heavy carriages, they are so ground, as to produce fresh matter to fix in: *which matter* is nothing more than part of the stones ground to sand, *very different* in itself, from that cement nature gave with the gravel. To illustrate my meaning, let us reflect a moment on the manner in which gravel walks are made. Is it not by gravel carried on as it comes from the pit? Now, if any gentleman, was to attempt to make a gravel walk, with screened gravel, I insist upon it, that if it is rolled to the end of time, it will never be, what we mean by a gravel walk. On the contrary, carry on the gravel as it comes from the pit, with its natural cement or binding particles; and it is well known, how solid a slight rolling will make it: nay, that even rain, with rolling, contributes to make it more so.

I will not say, that gravel, in *every* country, is fit to be carried on the roads, without *any* screening. In some, perhaps, veins of clay may run among it: and in others, veins of sand, or too great a proportion of it. This must be left to the judgment of gentlemen, in the neighbourhood of the pits; but, so much I am confident of, that I  
have



have seen many gravel pits in this kingdom, where screening was a detriment to the gravel. Another thing, I must observe, which is, that in general the deeper the labourers dig, the harder, and better is the gravel: and this they all know; but they are not fond of owning it. For the gravel is looser upon the surface, and easier dug; but the stones are rotten as they term it, soon grind to dirt: and so require to be renewed in a short time, after they have been laid on. This makes more work, and of course increases the expence.—Neither are the advantages of digging deep, confined to the getting the best and hardest gravel, in which the natural cement is found; that makes it bind like a rock. For another advantage would arise, which is, that instead of running over, and destroying several acres of valuable ground in a few years, half an acre would serve for many.

Digging of gravel about London, is four-pence per load; digging and screening nine-pence. Judge, therefore, what a vast saving here would be on the turnpike roads about London; on which such great quantities of gravel are used.

Methinks, I hear some honest surveyor reply, Sir, I admit the truth of what you say, as to the summer season, but it would by no means answer for the winter: to this deep reasoning person, I reply, that I would, by no means, have one load of gravel carried on the public roads about London, from the last day of September, to the last day of February, that is, for five months: and, I hope, I shall live to see an act of parliament, if it cannot be stopped without it, that will forbid gravel being carried on the roads during those five months. I would only allow a few load of stones to be shot at different parts of the roads, for the labourers to make use of, during those months, in case of any accident, by the road giving way in any particular place; which, however, will rarely happen, when roads are once properly formed. During those five months, I would have the labourers constantly employed in shovelling the roads and filling the ruts.

By



By this means, public and private roads will always be neat, and in good order.

Upon the return of summer, I would have what has been shovelled off in the winter, carried to the summit of the waves, and center of the roads : and covered with a coat of gravel : which will bind in summer, and become so firm by winter, as to discharge the water. Thus the roads will always be kept in their proper form, and good condition, at a moderate expence.

I was just going to conclude this letter, when a particular friend sent me—" The report of the committee appointed last January, to enquire into the management of such sums as have been collected for twelve years past, by virtue of acts of parliament, for repairing any particular highways,"—the reading of which, gave me great pleasure. For Mr. Whitworth, who made the report, seems to have taken great pains to be well informed : and, as there are some things which fully confirm part of what I have said, I must beg leave to add a word or two further.—Speaking of a certain great road, he says, three thousand five hundred loads of gravel were laid on a part of the road, which measured only *three quarters of a mile*, at an expence of near one thousand pounds yearly. It also appears, that eleven thousand four hundred and forty-five loads of gravel, are laid on that road, but the distance is not mentioned. What struck me much, is the following remarkable words (speaking of this vast quantity of gravel) which the committee apprehended, is owing *to some of it not lying above a month before it is taken off*. The report also says, it is necessary to prevent, such an amazing quantity of matter, from being continually putting on and taking off by the surveyors. Need I now ask, any reflecting gentleman, what must be the consequence of a road being covered thus by loose stones ? must they not every hour be reducing to sand, alias dirt, by the continual passing of heavy carriages ? or is it unfair, from hence, to infer, that if the gravel be carried on the road, in the summer, as it comes from the pit, with its natural cement, the

passing of horses and heavy carriages, especially those with broad wheels, will press it down as hard as a rock; by which means, the dust, in summer, will, in some degree, be avoided: and by the method I have before mentioned, the dirt in winter?

I think, I have now said enough to convey my meaning to any gentleman, who may chance to read this letter: and, therefore, conclude, with assuring them, that what I have said, is not *mere theory*. On the contrary, I am persuaded from *experience*, with respect to a certain road, that what I recommend is right in itself.

I am, GENTLEMEN,

Feb. 8, 1766.

Your most humble servant,

MAGO.

## NUMBER XVI.

*Queries relating to the Society's Premium for a Machine for slicing Turneps: And an Account of the Success of an Experiment, on a new Method, of making Hogs grow quickly fat: In a Letter from Mechanicus to the Editors.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

ON reading Agricola's letter, published in your last December *Museum*, No. 68. p. 386. I found a premium offered by that respectable, and laudable body, the London society, "That for the best cheap machine, for slicing turneps, for the feeding of sheep and horned cattle, with greater dispatch, than by any method now in use, twenty pounds will be given." Revolving in my mind the purport of this advertisement, I was naturally led into a train of reflection on the nature of a machine, that would suit the purpose of slicing turneps, with ease and expedition: and at the same time, correspond with the meaning of the Society's above-mentioned advertisement, in the cheapness and dispatch necessary for such a machine.



machine. As to the first requisite, cheapness, the instrument I have projected will, I flatter myself, answer that particular: since I think none can be less complex, and more cheap: and, if there be no other method in common use for slicing of turneps than with a knife by hand, as Agricola intimates, I think, I may venture to assert, without the least degree of arrogance, that the last requisite, dispatch, will be found included. For the largest turnep may easily be sliced into as many pieces as necessary (for the feed of sheep and large cattle) with one stroke of the machine: and the operation effected, by a boy of eight or ten years old: which will, I presume, be a further recommendation. As I intend to be a candidate for the above premium\*, I am very much embarrassed in what manner I can send, and introduce a machine for the notice and consideration of the Society. I can think of no other method to gain the necessary information, but

\* We are apprehensive, that, as Mechanicus's projected machine seems adapted only to the slicing one turnep at a time, it will scarcely come up to the idea and expectations of the Society, with respect to that intended by their advertisement for the premium he mentions: which, as Agricola has explained, in the letter above quoted, calls for something correspondent to the cutting-box for straw, that would operate on a number of turneps at the same time. Though certainly, a simple machine, that would cut one turnep at a time into slices of a proper size, would have some utility: as it would be an improvement of the common method of slicing turneps, with a knife, by hand. But if Mechanicus be desirous to become a claimant of that premium, he must carry his views further: and, in such case, he will have till the last Tuesday in November next, to complete and produce his machine: as he will find, on consulting the advertisement inserted page 56 of our last number. The manner of producing such machines to the Society, according to the advertisement, is to send them, before the expiration of the limited time, to their office in the Strand: where they are to be delivered to the Society's register. We give this information to Mechanicus, at his desire, as private members of that Society: for we would, by no means, have it mistaken, either from the title, or any other occurring passage in it, that this work is published under the direction of the Society, or of any committee appointed by them. R. E. T. H. O. A.



through the channel of the *Museum Rusticum*, and humbly hope some of you, gentlemen, with your accustomed condescension, will, in your next publication, allow me a page for this letter ; and a few necessary directions by way of note, in what manner I can best introduce the above machine : and also, the time limited for its appearance before the Society. As that particular is not mentioned, in Agricola's letter, the time may be elapsed : and any further application precluded.

I am, GENTLEMEN,  
Your much favoured,  
MECHANICUS.

Near Stafford,  
Jan. 11, 1766.

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GENTLEMEN,

THE subject of this letter, was intentionally to have been a part of my last, had not the intervention of particular business obliged me to close it in the manner you received it. I am confident, that many may receive benefit, as well as myself, by the following practice in similar cases. It is very well known, that the feed for hogs has, of late, been remarkably dear, consequently, most, who had it to buy, allowed their hogs less time than usual to compleat their feeding for slaughter. This case was mine. For I only allowed a midling-sized *hog*, pretty full in flesh, five weeks : the first and second of which, he eat me a bushel and a half of pease. I perceived him to be very little better, which was owing (as I afterwards found) to his drinking but a very small quantity of *liquid*. As he had now only three weeks to live, I was afraid he would not be fit for the knife at the end of that time, unless I could contrive some expedient to make him more thirsty ; I therefore was resolved to try the effects of a little salt mixed with his pease. I did so, it answered the end, he became prodigiously thirsty ; and grew in fat surprisingly.

I had him killed at the time proposed, and the butcher was surpris'd at the possibility of his being so fat, in so short a time. I am therefore determin'd always to mix  
a little

a little salt with the feed of my *hogs* for the future: being well assured, that it will save both time and expence: and I dare say, those who make use of the same expedient, will have no just reason to complain. It would be ungenerous, gentlemen, not to acknowledge that I received this useful hint from the *Museum Rusticum*, though on a somewhat different application: yet, nevertheless, it would appear very ungrateful in me, to receive benefits from your useful *fountain of intelligence*, and make no return. Certainly, the Editors of the *Museum Rusticum* have a just claim to receive, from their correspondents, every collateral improvement, conferred on each individual, through the channel of their useful *miscellany*. Mutual advantages are the cement of society, and the distinguishing characteristics of men and manners: consequently, that man is an unworthy member of community, who makes no returns for acknowledged benefits, suitable to his circumstances and abilities. I am naturally led into this train of reasoning, by way of apology, for having nothing better to offer in lieu of experienced advantages.

One of you, gentlemen, who signs himself, O. very kindly seems to intimate, that my future correspondence will not be unacceptable. I am greatly obliged to him for his ingenious compliment, and only wish that I had merit and capacity adequate to my inclination.

I cannot close this letter, without first paying my sincere respects to your ingenious, and good-natured correspondent, *Philomath*. It would be ungrateful to withhold my best acknowledgments on this occasion. I much approve of his instructions, and shall pay a suitable regard thereto. I am, GENTLEMEN, with the sincerest inclination,

Near Stafford,  
Feb. 9, 1766.

Your devoted humble servant,

MECHANICUS.

NUM.



## NUMBER XVII.

*An Account of the Nature, Culture, and Uses of Bird-grafs, with some Observations on the Utility of Burnet, Lucern, Timothy-grafs, and Poa-grafs ; and some Hints for the Improvement of Ploughs, communicated to the Society for promoting Arts, &c. by Mr. Rocque.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

HAVING presented the inclosed letter and observations on bird-grafs, and several other articles in husbandry, to the *Society for promoting Arts, &c.* in order that they may give them such a due sanction and recommendation to the public, as they may be found to deserve : and being desirous, by every means, to render my endeavours useful to the world, I here send a copy of them to you also : hoping that you will, the first opportunity, insert them in your valuable collection ; and thereby diffuse the benefit they may afford among your numerous readers : the only method of rendering discoveries in agriculture of general utility being, the making them generally known. Your complying with this, as you have with my former requests, will much oblige me.

I am, GENTLEMEN,

Your obedient humble servant,

B. ROCQUE.

To



*To the Society for the Encouragement of Arts, Manufactures,  
and Commerce.*

GENTLEMEN,

AS the favour and protection, I have met with in this country, inclines me to exert myself on all occasions in its service: so the particular countenance and generous treatment I have received from your Society, renders me eager to seize every opportunity of presenting my tribute of gratitude to you. Both these motives have had a share in exciting me to make this application. But there is another reason for my addressing myself to you in particular, on this occasion: which is, that it concerns a matter, wherein I consider myself as acting in a trust: and a part of the office of that trust was, to bring the subject before you in due time. But to render this intelligible, give me leave to lay the following circumstances before you. The late Mr. Peter Wych, then chairman of your committee of agriculture, among many other public-spirited endeavours for the improvement of that art, procured from America, the seeds of several various kinds of grasses. In the number of those, was one called *Bird-grass* \*, of which he entertained the highest hopes, that it might prove very advantageous to this country. He put an ounce and a half of this seed into my hands, in March 1764, with

\* A short account of the bird-grass, and a plate of it, have been before given, in the fifth Volume, No. 9. Page 44. This species of American grass certainly merits the regard of the public here, from that peculiar quality which is apparent in it: viz. its exceeding strong power of vegetation, that renders it capable of supporting itself with vigour on dry land; maintaining its verdure even after ripening its seed; and spreading its roots so fast, as to fill up, in a very short time, every void space of ground near it. If additionally to this important property, the copious production, both of seed and hay, should prove to be, as Mr. Rocque imagines, this grass may be esteemed a very valuable acquisition to husbandry. H. E.

intent that I might cultivate it : and that we might inform ourselves of its nature and qualities, in order to bring it properly before you ; that, under your sanction, it might be made known, and rendered useful to the public, if it appeared capable of being so. This was his design : but his death prevented its being carried into execution by himself. I have, notwithstanding, proceeded with the greatest attention to perform the part which was committed to my care : and having raised, propagated, and duly observed this grass, am clearly of opinion, it has several qualities, that will render it serviceable to this country. I have drawn up an account of these my observations : which I here submit to your consideration : being confident, your judicious examination will bring to light the true use of this grass, and your high reputation procure the attention of the public to it, if found deserving, in a much more effectual manner, than my humble endeavours, as a private person, possibly can do. If, nevertheless, it should appear to you, gentlemen, that any thing I can do further, will assist, in effectuating this purpose ; I shall be proud to receive your commands : being on this, and all other instances, ready to prove myself, GENTLEMEN,

Your most obedient, and most  
obliged humble servant,  
B. ROCQUE.

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*An Account of the Nature, Culture, and Uses of the  
Bird-grass.*

IN the month of March, 1764, I received from the late Peter Wych, Esq; the chairman of the committee of agriculture in the Society for the encouragement of arts, &c. an ounce and a half of the seed of a kind of grass called bird-grass. He obtained it from Virginia, where it grows, though it is not a native plant. The intention of putting it into my hands was, in order that I should  
cul-



cultivate it, and be thence able to form a judgment whether it might have any peculiar properties not found in our grasses, that would render it an advantageous article of culture here. He had himself, conceived a very high opinion of it, by the information he had gained concerning it, from the country whence it came; and intended, as soon as he should have due proof from experiment, of what he hoped, to bring it before the Society for the encouragement of arts, &c. who had, with public-spirited zeal, entered very minutely into the consideration of the means of improving pasturage. Being very solicitous to acquit myself of the trust, I carefully preserved this little treasure till the month of April: which I thought might be a fit time to sow it. Not being acquainted with the particular nature of this grass, I prepared the ground for it, in the same manner, as I should have done for a flower-bed: raking it with a wooden rake. I did this, as I was willing, by every means, to secure its coming up: but such care would not have appeared in the least necessary, had I known its great hardiness, and force of vegetating power, as I have done since.

At the time I expected the bird-grass to rise from my seed, I found the weeds and common grass coming up very thick: so that I could not distinguish the desired kind from these intruders; particularly the poa-grass. Being a stranger, as I before said, to the appearance of the bird-grass, I thought it the best way to weed out the other grass and herbs, which I knew, and to let, what I could not distinguish to be so, remain in the ground: and my eagerness was so great, to perceive, whether the bird-grass was come up, that I went almost every hour to look after it. I discovered it at last, in about a month from the time of its being sown, by its having a deeper green hue than is commonly seen in our grasses: and I transplanted it, as soon as I imagined it would bear moving, into some of the same kind of ground, as that on which it had been raised: having first turned it up and cleared it from weeds.



The size of this piece of ground, was about twenty rods: part of it a little gravelly, and the other part of it moory land. I soon observed, the bird-grass grew better on the gravelly than on the moory part of the ground. That, on the gravelly, being of a better colour and sweeter than that on the moory; which was pale and yellow. And with respect to the moory ground itself, one part was moister than the other, and the bird-grass grew better on the drier side, than on the wet. The grass looked well, however, all the summer, and, in the month of September following, I began to gather the seed, and proceeded in it till October. The product of seed was in quantity about twelve pounds.

The first year, the grass did not grow to be above two feet and a half high: but the second, it rose to be four feet high. On the 14th of June of that year, being 1765, I measured out ten rods of this grass; and cut it. Three days after, I weighed the product of this ten rod, herb and seed together; and they amounted to twelve hundred pounds. The 10th of August following, the same grass was again grown to the height of two feet eight inches, and was a second time fit to cut for hay: but I did not cut it; because, I wanted a second crop of seed: which I obtained in the beginning of October; and it proved a much greater crop than the former. About this time, a good deal of rain fell: which occasioned me no small share of trouble in drying the grass, and turning the little cocks. I then first remarked, that shoots were made from almost every joint, in consequence of the moisture: but, from some more than others: and of these many were of a finger's length. Had I not suffered this grass to stand, that I might save the seed, I am satisfied, I could have mowed it thrice in the year: but wanting to collect as great a quantity, as I could, of the seed, I have not yet actually tried that experiment. I am very confident, however, that this kind of grass may be brought to afford *eight tons of hay per acre*, in the year: and any person who may entertain doubts of the reasonableness of  
 3 this

this supposition, may have them cleared up by ocular proof, if they will take the trouble to call on me ; as great numbers of gentlemen have already done, to their intestine satisfaction in this point. The latter end of May, and the beginning of June, will be a proper time for such inspection ; as this grass, being a forward kind, will be fit to cut at that season.

This grass has a peculiar quality, different from what is found in any other kind I ever knew before ; which is, that it has very short joints, and that every joint sends out shoots, which strike root whenever they touch the ground. On taking a full grown plant of the grass out of the ground, it will be found, moreover, capable of being divided into twenty smaller roots or offsets, proper to be again planted : and these offsets, though taken thus from the root, even in the beginning of July, will bear seed the same year. If, likewise, when this grass is ready to be mowed, there should happen to be much rain, no damage will ensue on waiting a month for fair weather. Because, as this grass is constantly sending out shoots at every joint, it always keeps fresh : and does not wither, nor rot at the bottom, as other grasses do : but, on the contrary, it continues green, even till the seed be ripe : which is certainly a very singular property, and of great consequence.

The goodness of this kind of grass, may also be very obviously inferred from the following particular. When I first sowed it, which was in the month of April 1764, I had, as I have above declared, only one ounce and a half of the seed : but betwixt that time and the present, I have found such a surprising increase, that I have collected from the successive products of this ounce and half, as much seed as has sown two hundred and fifty acres of land : and have besides, as much by me, at present, as will sow one hundred acres more.

I shall not now dwell any longer, on the commendation of this grass, than only to say, that it has every quality requisite to make good hay. That it is easily propagated, and from a very small proportion of seed. That it is not



subject to rot, or fail in patches, as most other kinds of grafs do. That it is a beautiful green at all times, and consequently affords a most pleasing verdure, when sown in sight of any house, or made part of any prospect. And lastly, that the produce of hay from it is extremely great: being much more than any other kind of true grafs will yield. Of the truth of all this, many persons can witness, who have, on seeing the real trials respecting it, given the greatest encomiums on it. I shall, therefore, proceed now to offer some directions for its culture.

The ground, on which the seed of this kind of grafs is intended to be sown, is to be prepared in the manner that would be proper for lucern: that is to say, it should be well ploughed and harrowed; and cleared as much as possible from all weeds, in the same way as is done for barley. When the ground is well mellowed and sweetened, the seed may be sown: the quantity of which may be about one pound and a half per acre; and the time of doing it, from March to April.

Before the bird grafs seed be sown, it is proper to sow as much barley, or oats, as will afford half a crop: and such barley or oats being harrowed in, the pound and half of bird-grafs seed must be sown over it: after which, in general cases, the ground is only to be rolled the first opportunity, when it is dry. But if the soil be sandy or dry, it may be proper to give it a very light harrowing.

This kind of grafs cannot be well sown without some corn. Because it is of so fine and delicate a nature, at its first coming up, that the weeds would overpower and choak it, at that time: or a great expence would be necessary for cleaning them away by the hand. But, when this grafs is so mature, as to be in the state of a pasture, or fit to cut, it grows so close and thick, that if a handful of money was thrown up over it, none would, when fallen, I am certain, reach the ground.

As to the nature of the soil, proper for the culture of bird-grafs, almost every kind will do very well for it; except, as has been observed before, such as is too wet or moory;



moory; and this is one of the good properties of this grass. Because few kinds flourish much on dry gravelly ground.

This is a just account of the observations and experiments, I have hitherto made on this valuable grass; and they seem sufficient to justify me, in endeavouring to render it known to the public, as an object worthy their attention.

*Observations on the Uses of the distinct Culture of Grasses, is illustrated by Bird-grass, Burnet, Lucern, and Timothy-grass.*

It has been objected by some, against the means I pursue in my endeavours to serve the public, that I strive to introduce too many sorts of grasses, and thereby confound the farmer, in consequence of the various natures of those I have lately cultivated, and exhibited to the world. To this I answer, that it is advantageous to know the different qualities and dispositions, of as many as we can, in order to chuse the best, for each purpose, from among them; and understand the right method of its separate culture. For, is not all the benefit, which can be expected from the several common mixtures of grass in the field, extremely limited and small, compared with that of the best kinds, when singly cultivated by the most improved methods? Let me, therefore, intreat the farmer to make such a trial as this.

Sow four acres of land, with the four following kinds of grasses. One of *bird-grass*, one of *lucern*, one of *burnet*, and one of *Timothy-grass*. Spare no pains, nor expence, to prepare the ground; nor to weed and keep it thoroughly clean and sweet: for, *No care, no crop*, is a good adage. Let the greatest attention be had to this, till the cultivated grasses gain sufficient strength; and they will then maintain their ground, against the encroachment of weeds, by their natural power, without human aid. Spare no pains, nor expence, I repeat; and I desire no more, in order to be able, from the consequences, to make good my point, and convince the person, who sets about such a trial, by experience, and the evidence of his own senses. The utility will thence soon appear, of multiplying these four acres to forty. The task of a trial of this kind is not great,  
either

either from the expence or trouble; and the advantage would, I am sure, be such, that the undertaker must be thoroughly compensated for his charges, attention, and labour, be they ever so great.

If we were to enter into a detail of proof on this head, by instances, I could cite several facts in support of what I have here advanced; but to avoid dilating this account beyond a commodious bulk, I will only introduce one regarding burnet.

The 26th of this month, I went to the house of Mr. Baldwin, at Clapham. He was abroad himself; but his servant told me, that the dairy-maid had turned her master's cows, when they were almost gone dry, into a piece of *burnet*, during the severity of the frost; and that the consequence was, the finding, to the great astonishment of both the master and maid, that the cows, not only soon regained their good looks, but gave as much milk, as they had done in summer. Whoever has the curiosity, may be satisfied of this particular from Mr. Baldwin's own account of it; by applying to him. Had burnet only the two important properties of vegetating in winter, spite of the rigorous opposition of frost, and of not only maintaining itself, but paying the contribution of a large burthen, when cultivated on poor land, would not they render it of high value? But it has, over and above these qualities, others still more beneficial.

As to lucern, I need not mention any thing particular in its recommendation. The great increase of the culture of it, within these few years, is the strongest proof that can be given of its utility: as it is evident thence, how much experience has evinced the benefit of it. I have seen it mowed five times in the year, and yield in the whole eight loads of hay per acre. I would not, however, advise the mowing it above three times.

I shall spare saying any thing more here, in confirmation of the advantages of the three first kinds of grass, by referring for the further illucidation of their nature and uses, to a treatise published by me in 1765, and sold by Mr. Davis in Piccadilly.

As



As to bird-grass, its qualities and hay, have such excellence, that I make no doubt but, in a few years, it will have the preference to all other kinds.

I leave it, therefore, to all impartial judges to determine, whether a collection of such grasses, as these are, will not be of very great advantage to the public; as the ground may, by their means, be brought to afford, at least, three times as much food for beasts, and of a more kindly nature, than it will by the promiscuous growth of common field grasses. The practice of the separate culture of these kinds establish, likewise, a dependance, that there will always be a provision for the cattle of good sweet grass, without any mixture of bad: and the same certainty will also accrue, that the milk, cream, and butter, of cows so fed, will be wholesome, well flavoured, and abundant in quantity.

I think a collection of these four kinds only, is sufficient to answer all purposes whatever; if they were thoroughly understood. Some or other of them, are suitable to every kind of soil. I could find out a much greater number of others, that would likewise be really good: but I have been hitherto attentive only to select such as were most generally useful; to study the disposition of them, with respect to the various natures of the soils on which they may be sown; and to make the sweetness as well of the green herb as hay, and, above all things, the quantity, the objects of my preference. These criterions of goodness will, I am sure, be found in the four, I have thus adopted.

The improvements of pasturage is a very extensive view; and doubtless admits of many other momentous discoveries: and if those people, who pass their time in criticising on what others do, were to apply it in actual researches on this subject, they certainly would find much better employment, and be more serviceable to their country.

I must beg leave to add one remark, before I conclude. When Mr. Wych put into my hands the ounce and half of bird-grass seed, he told me, he had given parcels of the same to many other people. But to this day, I have never  
been

been informed of one single person, who either cultivated, or propagated any of it, but myself. So that I may justly claim the sole introducing the culture of this interesting article into Great-Britain.

*A few Hints on Poa or Suffolk Grass.*

The first intimation I received, with regard to poa-grass, was from Windham Boyer, Esq. He told me, sheep were excessively fond of it: and that he would give five guineas to any person, who should procure him a pint of the seed. On this recommendation of it, I set half a dozen people to work, to gather me some of the seed: and I computed afterwards, that the expence I was at in collecting it, under these circumstances, was in the proportion of about seven shillings for a pound of the seed. But were it to be gathered in a field, where this herb was the sole vegetable inhabitant, that expence would be reduced to about eighteen pence.

I sowed a patch of this poa-grass, the 6th day of May 1765: and, at the same time, close by it, another patch of bird-grass. The weather was so dry, that it was a long time before either of them came up. But at last a few plants of both appeared; and produced seed the same year. The seed of the poa-grass, was ripe about fifteen days before that of the bird-grass. I gathered the former, and let the other be shed.

Some time after, I directed some of my people, to weed out the bird-grass, that was amongst the poa-grass. But, by mistake, they pulled up almost all the poa-grass; which deprived me of the opportunity of making such accurate observations, as I wished to have done. However, finding the poa-grass to be a very forward or early kind, I am taking further pains to make myself acquainted with its other qualities. I find it is to be met with in all good lands: and a dwarf kind on the sides of ditches. When the plants grow singly, it will rise to the height of a foot. I have seen some of it flourishing in the water, from whence a clear inference may be drawn, that it will grow in any marshy



marshy land. It is not a property of this grass to be high : but, it is very thick at the bottom : and I believe it is always in sap, and keeps continually vegetating. The growth is so quick, that it ripens its seed the latter end of April.

I am strongly of opinion, this kind of grass will make a very good pasture for sheep, but it is not a fit one for mowing. In the application of it to feeding, a saving is made from there being no need of manure, as the sheep is to be kept folded on it. And, in this state, the grass will always be free from and void of all kinds of weeds. A great expence is constantly incurred by gentlemen in laying down avenues, lawns, or bowling-greens. A small quantity of this grass would intirely answer their purpose, if the ground were first thoroughly prepared. To be convinced of this, let any person take the trouble of examining Parson's green, near Fulham, or the fine patches on Putney common. The verdure will be there found to be all owing to this grass : and how much finer would it be, if these places were not injuriously trod by every passenger ? and if nature alone, under these disadvantages, produces such a pleasing appearance, would not the effect be rendered very fine by the aid of art, in preparing the ground, and securing the product from the continual depressive intrusion of rude feet ?

*Some Hints for the Improvement of Ploughs.*

I have been for a long time inquisitive to know, whether a plough could not be made in such manner, as to avoid the horses walking in the furrow ? But I met with no satisfaction in this point. I some time ago asked a journeyman to Mr. Salkell, a coach-maker at Waltham green, if he could make such a plough. He told me, he believed he could : and that he had made one, which he called a *turn-rise plough*. On examining it, I found it was not made in the intention here proposed, nor on the principle above mentioned : but it goes so easily, that it will do more work with three horses, than the *swin plough* will do with four, being drawn with so much less power, and turning up the ground better.

The chief remark I made on seeing this plough work, was, that there appeared no necessity, the horses should go in the furrow, as they may equally well go on the lands. I asked the ploughman, whether the horses could not be brought to keep out of the furrow, and he said, they might be taught to do so in a week's time. If that be true, and that this plough can be managed to answer in this way, which in my opinion is nearly effected already, it would be a treasure to the farmer.

The reason of my being so earnest to have such a plough, is this, that the horses, treading in the furrows, make the ground very hard, and this repeated every year, it becomes so tenacious in dry weather, that the fibres of the roots of the corn, &c. cannot possibly penetrate it.

## NUMBER XVIII.

*Further Reflections on inclosing of Commons, and engrassing of Farms.*

GENTLEMEN,

**I** Yesterday read, to my great surprize, in the St. James's Chronicle of the day, an excellent letter, in defence of inclosing of commons. My surprize was not occasioned by finding an excellent letter on that subject, which is of very great importance to the public, and may, therefore, afford many excellent reflections and assertions; but to find it an *original publication* in that place, for it was directly addressed as a confutation of the *unsupported*, but *dangerous* assertions of a correspondent of yours, the *old-fashioned Farmer*. Now my surprize arose from finding, that this excellent letter was not *originally* addressed to you; for as the *poison* is in your collection, the *antidote* should have been there too, as one naturally expects from the *candour* and *judgment* of the writer.

I do not pretend, gentlemen, to conjecture with any great degree of confidence, what was the reason why the



writer of that letter did not address himself to you; but I apprehend, he imagined from your publishing the old-fashioned Farmer's *entétemens*, that you would not willingly receive his confutation. In this sentiment however, if he entertained it, he must have been mistaken; for it must be acknowledged, that you publish *very freely* on both sides of the question. Your work is indeed chiefly dedicated to *original publications*, addressed to you; but the nature of it points out very prudent deviations from this general rule, by republishing such pieces, as have a close connection with the subjects treated of in your several numbers; and especially if these republished pieces contain such matter as *illustrates obscurities*, or *confutes errors* in the assertions of your correspondents. On this ground, gentlemen, I strongly recommend to you the re-publication of the letter above mentioned, and also of another on the same subject by the same hand, published a post or two before in the same paper: which I have not seen, but should be glad to see, if it have *as much*, or *nearly as much*, merit as this which I have read; because, by such re-publication, an excellent piece may be rescued from its present fugitive state, and preserved \*.

\* We shall always have a pleasure in complying with any requests of our correspondents, whenever it is not inexpedient. The reasons here given by Mr. Comber, for the insertion of these observations, though before published, seem very good. The subject is, at present, greatly interesting; the manner of treating it sensible and candid; and we are far from thinking it inconsistent with our design, or professions, to rescue, as is here observed, any excellent pieces, from that fugitive, or rather still-born state, in which they may be justly deemed to be, when published in journals or daily papers, and to preserve them in our collection, where they may, on any proper occasion, be recurred to. We agree, likewise, with Mr. Comber, in thinking this more particularly proper, where the pieces contain any answers to, or comments on, those which we have published; as it is our desire to furnish the most ample information of every subject we lay before the public: and as, from the multiplicity of journals, and news-papers, of which in general only one is read by each individual, but a very small part of our readers have the chance of meeting with what is inserted only in any single paper. R. O.

Your correspondent, the *old-fashioned Farmer*, is very violent against the *engrossers of farms*; and I have agreed to condemn them in a *certain degree*, and on *certain occasions*, and with *certain views*. My chief objections to such engrossers have always been, that they seem *capable*, on *some occasions*, of engrossing the fruits of the earth, and raising the prices to an *unnatural* height; and that as they will be able, from *more extensive farms*, with *less culture*, to maintain their families, and lay up money, they will probably be tempted to bestow *less culture*, and consequently the public will sustain loss.

However, gentlemen, I must confess, that on mature reflection it appears to me, that considerable abatement of the force of these objections is to be allowed. For in *many*, perhaps *most* cases, the expences of the great farmers are proportioned to their receipts, and few of them are able to engross corn, &c. in any very considerable quantities. Again, it is as likely (or more so) that a *large farmer* may be a *good husbandman*, as a small one; and when the great farmer has *skill* and *activity*, it is as *good* (or *better*) for the public, that he should exercise this *skill* and *activity* in a *great* as in a *small farm*.

I have met with some sentiments of this sort in the corner of a *monthly publication*, where they are little *seen* and *observed*. It seems, therefore, on the principles above stated, an useful work to bring them to more light, by a republication in your *Museum*, and they are as follow: "A writer, who signs himself a citizen of *London*, &c. the resentment of the people would soon prevent it." See Gentleman's Magazine for last month, p. 486.

I am, GENTLEMEN,

East-Newton,  
Nov. 4, 1765.

Your most obedient humble servant,  
THOMAS COMBER.

*Reflections*



*Reflections on inclosing of Commons, and engrossing of Farms.*

*To the Printer of the St. James's Chronicle.*

S I R,

**I**F persons who have inclosed their estates, and whose advantages may suffer some diminution by their neighbours following the example, could be so mean as to league with those who find their account in a fraudulent or oppressive occupation of their open and common rights, it might be suspected that the clamour and riotous behaviour, lately carried to no small degree of violence by the latter, had received encouragement from the former ; but I would rather hope, (notwithstanding some uncharitable suggestions to the contrary) that such persons of property, who have been instrumental in the propagation of prejudices, are really mistaken in their notions themselves ; and have not either felt the advantages of inclosures, or considered the peace and quiet enjoyment of the improved property of their neighbours as incompatible with their own. Cautious, however, every one should be of throwing out inflammatory or fallacious insinuations, especially amongst the uninformed multitude, where it is wonderful how great a fire ever so small a spark kindleth. Although it is not easy to acquit some late reports of malevolent intention, yet, as many people have, no doubt, been deceived by specious and popular arguments, which they propagate without any ill design, and which, nevertheless, are sometimes attended with bad effects, it becomes the office of a good citizen to examine such prejudices with freedom and candor ; and instead of filling peoples minds with false terrors, to endeavour to conciliate them to every salutary measure ; and on all occasions to aim at the removal of fear where there is no danger. Some of the most popular objections to the inclosing of common fields have been considered in former letters ; and I now would take some notice of the accumulation of farms, by substantial renters, and the consequential annihilation of the little ones, by which  
some

some people seem to be very much alarmed. Overgrown estates (as hath already been observed) are detrimental to the commonwealth; and overgrown farms may, in some degree, be so too; but as they are both evils which are produced by the natural course of things, so they are also best removed thereby. One is pulled down, and another set up, every day. We have seen a very few years reduce some of the largest estates in this kingdom, so that the house laid to house, and the land laid to land, are again so divided, that they are hardly called by the names of those who collected them. Many such instances also happen in great farms, which cannot possibly escape the notice of persons of observation. Enormous estates are more dangerous to the public weal than enormous farms; the latter are not increased, but the former are *restrained* by inclosures. It is evident, that the less land a man takes to employ himself or his money upon, the more room there will be for others. If a person possessed of money to purchase a thousand acres of open field, can realise it in six hundred of inclosed land, then it is plain, there are four hundred left for another market. As to farms, the questions which respect inclosures are, whether the reduction of small ones is a public evil? And whether very large farming is promoted by inclosures? Both which propositions I do not scruple to deny. By small farms, I mean, *very small ones*, which, indeed, are little better than nuisances, and the nurseries, or at least the habitations of distress and beggary; and by large ones, I mean those on the other extreme, which, however, are much more impolitically demised by the landlord, than rented by the tenant, or permitted by the state. Experience will, and, I presume, hath shewed, that the landlord, who lets out his estate in the middle way, fares the best; and it is not to be feared, but, that from such experience, all public interposition will become as unnecessary, as it would be hazardous, or perhaps in some respect certainly detrimental. A prudent arrangement of farms with proper proportions of meadow, pasture, and tillage-lands, is not only much easier



easier made in inclosures than open fields, but (directly contrary to what hath been as confidently asserted, as blindly and implicitly received) I think it would be no difficult matter to prove, both from reason and experience, that the want of such fitness doth naturally bring on an accumulation of farms in open fields; and that inclosures are not only better suited for, but do as naturally tend to sub-division both in farms and purchases.

If by \* “gentlemen adding farm to farm, all necessities of life are raised, common people are ruined, and the country depopulated,” as hath been alledged: if the † “very great progress made in inclosing, of late years, doth contribute to hurt the poor, advance the price of corn, and depopulate the country,” such evils most certainly ought to be tolerated: but it seldom happens, that a person engages in the support of either of these charges, but he answers himself. I have in these papers purposely avoided controversy where I could; but I am under some necessity of observing, “that if ‡ butter, pigs, bacon, cheese, and corn, are all made dearer, by the adding “farm to farm,” then it must be either, 1st, That the fruits of the earth are thereby reduced, and less quantities raised in such farms; or, 2d, That more are consumed on the spot, so that of consequence less come to market; or, 3d, That the price of such fruits is artfully and unreasonably kept up by these monopolizers. That the products are reduced, no one will say; for though it be observed, that, in Warwickshire especially, “§ it seldom happens, “that any great quantity of large farms are kept in tillage,” yet I suppose none of the Warwickshire land in those large farms lies *unemployed*. If corn be dear there, we are told butter, pigs, bacon, and cheese, are equally so; and we may imagine, from the instance given of the increased poor’s rates at Birmingham, that beef and mutton are not very cheap; so that we may reasonably conclude,

\* Museum Rusticum, Vol. IV. No. 1.    † Ibid.    ‡ Ibid.  
§ Ibid.

that the dearthness arises not from any unequal or improper culture: and indeed of our own knowledge we can venture to assert, that the products in Warwickshire have greatly increased within twenty years, and more provisions of all kinds have been raised annually in that county than were before the very great progress had been made in inclosing. But the argument ought not to rest on particular examples: we insist, that reason and experience prove, beyond contradiction, that the products of the earth (of some kind or other) are far from being lessened by any accumulation of farms. When we hear one person complain, that fewer sheep, &c. are kept, and another, that less grain is raised by means of the inclosing of fields, and the ingrossing of farms, we may presume, till the markets in one kind fall in proportion to their rise in another, that prejudice and error have too much influence on both. The next question is, Whether, in large and inclosed, more provisions are consumed than in open and smaller farms, so that less provision comes from thence to market, although it may happen, that an equal or greater quantity be raised therein? But this, and the remaining article, will be considered in what follows.

If in the second place we say, that in inclosed and great farms more provisions are consumed, and of course less comes to market, we shall be in danger of oversetting another argument brought by the *Warwickshire* \* *old-fashioned Farmer*, viz. that small open field-farms require a larger proportion of hands to manage them; if he had said of horses too, we should have been far from disputing it with him. Now, not to dwell upon the number of men, which hath been heretofore spoken to, permit me to observe, that if the products of an acre of land on a farm, be consumed by every horse that is kept for the tillage and management thereof, then for every horse reduced, the products of an acre of land come to market more than before. Suppose that a person keeps five horses to till and manage sixty acres of open field land (which, strange as it may appear, is well

\* Museum Rusticum, Vol. IV. No. 1.



known to be done in many places) and that by virtue of an inclosure five such farms are brought into one of three hundred acres, and managed with twice the number of horses; in this case the product of fifteen acres of land, in three hundred, will come to market more than if the field had continued in its open and unimproved state. I do not carry this argument to its utmost extent, because it may, as it stands, be seen and understood at one view, by persons with whom more laboured and intricate reasoning and calculations would, perhaps, be less convincing: and, indeed, without going further, it is very sufficient to shew that more provisions in proportion are consumed upon, and consequently less come to market from small and open, than from inclosed farms. Is then, in the third place, monopolization of provisions peculiar to large and overgrown farms? And are the prices thereof set at the arbitrary direction of two or three growers thereof? This is very popularly alledged; but unless two or three great men could ingross all the lands in the nation, or at least the district of some capital market-town (which I suppose at present we are in no great danger of) it is not to be conceived that it will be in their power considerably to raise the price of provisions of any kind. Nor, indeed, doth the mischief of ingrossing and monopolising lie at the door of the farmer; it is more in the power of one considerable mealman to raise or fall the price of corn, as the circumstances of his stock require, than of the most overgrown farmer in the kingdom. It is exactly the same as to butter, bacon, cheese, sheep, and oxen; the exorbitant prices thereof are never occasioned by, and seldom reach the pocket of the grower. That all necessaries are now dear is indisputable, and that they are equally dear, or nearly so, is as certain; and till the adversaries of new inclosurers can shew that the markets in the neighbourhood of them rise out of proportion to other places in the kingdom; or that one commodity riseth out of proportion to another (as hath been before observed) they will not be able to establish the doctrines they endeavour to inculcate. The rise of the poor's rates, it is ap-

prehended, is a grievance that prevails in all places, and may be rather imputed to the growth of luxury than of industry; to the waste of the common stock by an unnecessary number of hands employed in growing provisions, than to the increase of it, by the improvements in agriculture, commerce, and manufactures. I might ask, in what places are the poor more burthensome than in open and common fields? And what business is more over-handed than small-farming? But instead of waiting an answer, I will take the liberty to tell the *old-fashioned Farmer*, that though the luxury of the great, especially foreign luxury, is far from being an inconsiderable cause of the distress of the poor; yet not only tea, but the many other articles of luxury introduced amongst themselves, and not only amongst \* *Coblers wives*, but *all* the lower people, deserves a more serious attention than he seems willing to give it. As to the destruction said to be occasioned in the families of little farmers, it may briefly be observed, that the number of hands necessary in agriculture will always be employed therein, either as owners of land, farmers, or labourers; and it cannot be too often, nor too strongly pressed upon the adversaries of improvements, that the wealth of the nation doth not consist in the number of the people *unemployed*, or, which is much the same thing, employed in doing nothing. An increase of people, and an increase of employment for them, will naturally follow an increase of the fruits of the earth, unless any unnatural restraints be laid on the means of population. It is very true that on very great farms, and on very great estates, many young people of both sexes, are kept in a sort of covenanted state of celibacy; and in that respect they are (as hath been before admitted) both evils: the one is much more so than the other; for some married labourers are generally found on the greatest farms, and would be more, were it not for restraints often laid on the tenants in their leases, from hiring of servants by the year, so as to make them settlements;

\* Museum Rusticum. Vol. IV. No. 1.



and from the general effects of the poor laws, and those which in a manner prohibit *matrimony*.

It hath been observed by some eminent physicians, that no medicine is quite so innocent, but that if it does no good, it will do some harm. There is, in this respect, a remarkable analogy between the body natural and the body politick: the constitution of the former is more frequently impaired by medicines and quackery, than by the distemper itself. Nature is obstructed in throwing off her own incumbrances, by our laying upon her a load that she is unable to bear; by which means, small and transcient, or perhaps imaginary distempers, are converted into such as are real, permanent, and perhaps incurable. Laws made to remedy evils which never existed, or such as the natural course of the political system would, by degrees, remedy and wear out, are similar in their effects to unnecessary medicines in the natural body; and, like them too, are still the worse, if they happen to be of the bold nostrum, and rash empirical complexion. No science seems so universally understood as physic and politics; and as in whatever company you go, it is impossible to complain of a distemper, or even the apprehensions of it, without being stuned with remedies and preventatives, which, *if they do you no good, can possibly do you no harm*; but which no wise man will, on the strength of such a character, make use of: so are we as seldom at a loss for never-failing, and the only true original remedies against the diseases of the state, and the maladies, or, more properly, the complaints of the people, whether we talk with statesmen, lawyers, or artificers. He must be a cobbler, indeed, who does not know how to cure forestalling, ingrossing, and regrating, or who cannot deduce the present high prices of provisions from the accumulation of farms, and prescribe a caustic to eradicate a tumour, that in a reasonable time would disperse of itself, and be dissolved, even without the help of a *corn* plaster. I have therefore admitted, that very great farms have bad tendencies; but even there (to pursue the metaphor) when they come to a head, are sure to break of

themselves. I am afraid, that a limitation of them by law, would be attended with much worse consequences than can be charged to the account of accumulation; and though farms of a moderate extent are certainly best for the public, and for the landlords themselves, yet no prudent, candid, and dispassionate person, I suppose, would be desirous of seeing unnecessary restraints laid upon the enjoyment of private property, or upon the exercise of a right in the owners of land, which any tradesman would think hard to be deprived of.

The evils enumerated in the preamble of the statute of 25 Henry VIII. and suggested in many other acts of parliament, a general neglect of tillage, and a consequent depopulation (the fears of which may possibly have been transmitted to us by historians, whose reflections better suit the times they wrote of, than those they wrote in) are, by the great alterations and improvements made in arts, agriculture, and commerce, become less alarming than they were in those days wherein it was the wisdom of the legislature to limit farmers (who kept from four-and-twenty thousand to fifty thousand) to the number of two thousand sheep, at sixscore to the hundred, excepting the owners of land and spiritual persons, who upon their own estates were allowed to keep what number they pleased. A revival of this, and other tillage-laws, would be absurd; and the introduction of a new one, to prohibit gentlemen from letting, or farmers from occupying land above a fixed number of acres, or a certain rent, would not only be a dangerous experiment, unsuitable to the constitution of the present times, but even to the very inconveniences complained of: if the ingrossing of farms hath demolished hundreds, such an \* *Agrarian law* would annihilate its thousands of farmers; for thus limited in letting, and left at large in the possession and occupation of their lands, it would be no unnatural consequence for persons of overgrown estates to increase the number of their bailiffs and servants (already perhaps a grievance) instead of free te-

\* See Museum Rusticum, Vol. IV. p. 4. note marked E.



nants; and for the lands of this kingdom in the hands of slaves to become as ill cultivated as those of the Roman republic in a similar situation. The great and very remarkable struggle of Tiberius Gracchus to get the famous Licinian law revived, by which no person was allowed to possess more than five hundred acres of land, was brought on from his observing that rich people, who at first had caused farmers, natives of the country, to cultivate their estates, had found their account in employing slaves for that purpose, and from seeing himself the bad consequences of such an alteration; for, "in crossing Tuscany, in his way to Numantia, he saw the lands lie desert." And the reason given for it is, that "he found no other husbandmen, herdsmen, and shepherds, on them, but slaves from foreign countries."

It is very possible that two people may differ in judgment upon very material points, and yet equally wish well to their king and country. I hope the open-field freeholder, whose queries appeared in the St. James's Chronicle and other papers of the 16th, by entitling himself a hearty well-wisher to both, doth not mean to stigmatize the advocates of inclosures with an opposite character, by way of putting a stop to "those unlawful riots which are always injurious to innocent families, and to the public, as well as the rioters themselves \*." A scarcity, or high price of provisions, always disposes the lower people to tumults; and artful, nay indeed sometimes very artless, insinuations direct their fire. A mob raised by want of bread, or want of employment, may be managed to overturn a ministry, or an inclosure; and either to demolish government, or dressing mills. I therefore apprehend all inflammatory hints and insinuations, at such a time, will be carefully avoided by *well-wishers*; and I also hope (though I must confess I cannot say *upon my own knowledge*) that I herein express the sense of "many thousands of his majesty's faithful subjects †." The advanced price of bread-corn hath, no doubt, been the occasion of distress to many poor families in the king-

\* See the queries.

† Ibid.

dom; but if the price doth arise from large exportation, and not from real scarcity, the price of labour will rise generally in proportion, and the distress of the *poor* will not be *aggravated* thereby. The case is exactly the same with our manufacturers, as they will, on every balance of money in our favour, obtain an higher profit on their wares, and afford greater wages to their workmen. The fact is, that both farmers and artificers have much advanced the price of labour, though perhaps not quite in proportion to the dearness of all other provisions as well as of bread-corn.

The exportation of corn and meal doth certainly raise the price thereof, and, in general, greatly to the advantage of this kingdom; and therefore the current of the corn trade, should be as little obstructed as possible, for fear of diverting it into another channel; but certainly our necessities are to be first considered, and a less evil endured to prevent a greater. The surplussages of our products are the subjects of exportation. Keep all the corn that is raised in the kingdom at home, and the farmer, and perhaps some higher, as well as all the lower ranks of the people, must return to the food of their ancestors, who lived almost altogether on bread, and therefore became alarmed at the increase of pasturage in their times: send more out than can properly be called the surplus, and a proportionable scarcity, as well as an adulteration of what is left, will certainly ensue.

The exportation of corn at the time *when many thousand acres of land are yearly laid down for grass* in the new inclosures, is no peculiar disadvantage; forasmuch as lands are not inclosed for this or that particular use, but to the intent they may be applied to the culture they are most fit for, and to the exigencies of the times; which are advantages the public as well as the owners have in lands inclosed, beyond common fields ever tilled and pastured in one unvaried manner, unless it should please all the freeholders in the open field to consent to alterations and improvements, which it is observed very seldom happens. More grain is  
actually



actually now produced in the new inclosed lands than was when they lay in common fields; and perhaps the large quantity of corn and meal, which the querist alledges hath been lately sent abroad, is no inconsiderable proof of the probability at least of this assertion. In the very countries referred to in one of the queries, thousands of acres, heretofore kept in the ordinary course of open-field tillage, under the denominations of one-crop and two-crop land, and which then yielded little or no advantage to the farmer, have, when inclosed and in proper cultivation, not only produced more clear gain than the value of the whole crops which grew thereon did before amount to, but also a greater quantity of grain, in one year out of three, than before grew upon them in the whole three years put together. Exorbitant pasturage, and the annihilation or destructive reduction of tillage, are ancient and venerable phantoms; but it is absurd to suppose a person having full power over the land (which the open-field freeholder hath not) will cultivate and use it otherwise than as the markets, and consequently his own advantages require.

Though it hath been alledged by some, that the fineness of our wool is owing, in some measure, to the sweet short grass, on many of our pastures and downs; and, by others, that feeding the sheep all the year, without shutting them up in folds, is a great advantage both to the sheep and wool; yet, till lately, I never heard such a strange doctrine suggested, as that fallow fields, (on which the sheep are folded) did at all contribute to the improvement of the wool; the fineness of which doth not arise from the fallow lands, but from the kind of sheep, on which it grows. Place the western or hill country sheep, from Weyhill fair, or another sort remarkable for their fine wool, the black-faced sheep, bred chiefly in Staffordshire, commonly called Dudley Cots, in the very same fallows or pastures, with sheep of an inferior kind, and their wool will be always finer, and of more value by the pound, than their companions: this is notorious; and, I suppose, every year proved in the inland counties of Warwick, Oxford,

Oxford, Northampton, and Buckingham. But were it otherwise, what will obstruct the growth of the same sort of wool in the Cotswold countries, after they are inclosed, as is produced there now? There are two very bad distempers which affect the quantity and quality of our wool, the rot and the scab. The former is in some measure, at least, owing to the want of management, and often much prevented by the ditches, drains, and trenches, in inclosures, to the spreading of the other (which is infectious) is most certainly obviated by keeping the sheep in separate pastures; so that even this fallow wool, so much the object of the querist's apprehensions (though, I suppose, at this time sold for three or four shillings a tod less than fine pasture wool) may be better raised, and the sheep safer bred in inclosures, than in the generality, I believe, of open fields; but at all times *as well*.

Fallows are so far from mending the quality of wool, that the very same sort and size, grown in pasture, being always of a better colour, and cleaner from dirt, sand, &c. than that which is grown and penned in fallow fields, will always sell for the most money.

*Observations upon Ten Queries, &c. concluded.*

The sixth query, I apprehend, does not go at all to the public utility of inclosures. Particular persons may, through unreasonable expectation of improvement, situation, or of other favourite views, have been disappointed by an equitable course of distribution; or persons of very small property, not content with the improved value of forty or forty-five, or sometimes even of fifty years purchase of their lands, may have embarked in an expensive inclosure of a few acres, the fences of which have cost more than the estate is worth when inclosed: but I may venture to say, that the owners of ninety parts in an hundred of all the lands inclosed, within these twenty years, do not repent of their petitions to parliament. But let us turn this query to another institution, and ask, "Do not  
" many of those very persons now feel themselves injured  
" by



by matrimony, who were prevailed upon to sign and seal, by false appearances, or perhaps the undue influence of “their married neighbours?” And should this be answered in the affirmative, I hope the open-field freeholder is not so much an old bachelor, as to think of promoting the increase and commerce of this nation, by discountenancing matrimony. The doctrine suggested in the seventh query is totally indefensible. Open fields may be as high racked as inclosures; and, if the tenant makes no undue advantages of his situation, he may live better on an inclosed farm of fifty or sixty pounds a year, than upon one of the same annual rent, in an open field. On the subject of the eighth query, I would observe, that it is not the practice of inclosing our open fields; that depopulates the country, and drives the labouring hands into large towns for subsistence in the manufactures; but the allurements of greater gain and better fare, draw them from the plough and the flail. The manufacturer earns and spends double the wages of the labourer in husbandry. The increased number of menial servants, now kept in the capital, and other large towns, is another, and a large drain from the country. A lad who used to be content with the plain and homely diet of the farm-house, and five or six pounds a year wages, now pants after the life of idleness and luxury, a laced livery, high wages, and card-money: and as soon as he has raised three or four guineas, in the country, to get inoculated, away he flies to London, or some other seat of opulence, “in which neither the health, longevity, or increase of a country life are, indeed, to be expected.” Inoculation hath, in this sense, depopulated the country more than all the inclosures put together; and yet, I suppose, no man who hath ears to hear, or eyes to see, will be absurd enough to propose a stop to be put to this salutary practice. To the ninth query, viz. “whether inclosing doth not necessarily encourage monopolies,” I answer in the negative: I have given my reasons for this opinion, in several former papers, and shall not repeat them now; but only observe, that combinations (for a monopoly of land is impossible) are as effectually carried

on in open, as inclosed countries; and seldom, if ever, begin with the grower of the commodity. As to the tenth query, till it be known what the speedy and resolute measures are, which the gentleman hints at, and whether he writes merely as a freeholder in an open field, I shall content myself with placing in opposition to it, the judicious sentiments of a modern historian, and with them I shall conclude these observations: "These absurd limitations, proceeded from a desire of promoting husbandry; which, however, is never more effectually encouraged than by an increase of manufactures. For a like reason, the law enacted against inclosures, and for keeping up farm-houses (4 Henry VII. cap. xix.) scarce deserves the high praises bestowed upon it by Lord Bacon. If husbandmen understand agriculture, and have a ready vent for their commodities, we need never dread a diminution of the people employed in the country. All methods of supporting populousness, except by the interest of the proprietors, are violent and ineffectual. During a century and half after this period, there was a continual renewal of laws and edicts against depopulation; whence we may infer, that none of them were ever executed. The natural course of improvement at last provided a remedy \*.

I am, Sir, yours, &c.

F. B.

## NUMBER XIX.

*Account of an Experiment made on Hogs, by the Use of Sea-Water, under some particular Circumstances.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

**B**EING lately at a friend's house in the country, our conversation turned on agriculture: and the great use of the *Museum Rusticum*. A gentleman present, who lives near the sea, observed, that in consequence of salt being recommended in one of the Numbers, as useful in the fattening cattle, and cleansing them of their foul humours,

\* Hume's History of England, Vol. I. p. 65. 4to.



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*Account of an Experiment made on Hogs, by the Use of Sequa Water, under some particular Circumstances.*

*To the Editors of the MUSEUM RUSTICUM.*

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**B**EING lately at a friend's house in the country, our conversation turned on agriculture: and the great use of the *Museum Rusticum*. A gentleman present, who lives near the sea, observed, that in consequence of salt being recommended in one of the Numbers, as useful in the fattening cattle, and cleansing them of their foul humours,

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he had made a very advantageous experiment. He informed us, that, in stormy weather, near where he resides, there washed out a prodigious quantity of small stones that had the appearance of ore, when broken. They sparkled like silver, and emitted a strong sulphureous smell. On lying some time in the sea, they gradually dissolved: and as soon as the storm would admit, he sent for a quantity of the impregnated water: some of which he gave every other day to his hogs, mixed with their wash \*.

The days they had this water, they were exceedingly hungry and thirsty, and drank double the quantity of wash they usually did when they had not the water; that it purged and rendered them perfectly healthy, and they not only fattened in much less time, but the flesh was remarkably firm, white, and sweet.

If this information should be of use to any of your correspondents who may be desirous of trying this experiment, it will give great pleasure to, GENTLEMEN,

Your constant reader, and well-wisher, R. B.

\* It is to be wished, that the gentleman, who made this experiment, had informed himself more particularly of what nature this substance, that resembles ore, which nevertheless dissolved in the sea-water, was. Without such information, no certain conclusion, as to that body, can be drawn from his account: the description not answering to any known fossile, or indeed other substance. We may, however, not unreasonably impute the effect on the hogs, to the salt in the sea-water, conformably to what Mechanicus has advanced in his letter, inserted in this Number, p. 116. In that view, this fact may be of useful consideration: as confirming what Mechanicus has asserted: and this account further shews, what might otherwise have been doubted, that, notwithstanding the hogs seem to grow fat, in consequence of drinking greater quantities of fluid, yet the fat and flesh are firmer, and better flavoured, than when no salt is given to them. Should this use of salt, or sea-water, on further trials, prove, as these two experiments, (Mechanicus's and this gentleman's) suggest; and that hogs can be thus fattened, and have their flesh rendered better, with a great saving in the quantity of their food; it will be of very high public utility: and may be deemed an important discovery.

At all adventures, we are obliged to this gentleman, for imparting the matter to us, since the relation of every extraordinary fact of this kind, has a tendency to the bringing to light principles, that may in the end yield great practical advantages.  
R. E.

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

I Have been a purchaser of your *Museum* from the *beginning*, and have read it with much edification; but it was with *particular* pleasure I observed *G. B.* in the postscript to his letter from the Isle of Ely of August last, promised you *their* method of fattening beasts with oil-cakes; also an account of a *better, cheaper, and quicker* feed, &c. I accordingly have *impatiently* expected to see it; and if you know that gentleman's address, you will much oblige me if you will write to him, and favour me with the result by letter; unless you can *conveniently* let it appear in your next (this month's) publication, as I have my reasons (and those of a very particular nature) for being urgent to know it before *Lady-Day* \*. I am, with esteem,

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Feb. 11, 1766.

Your very humble servant,

J. H.

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# Museum Rusticum, &c.

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For MARCH, 1766.

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VOLUME the SIXTH.

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NUMBER XX.

*Observations on the Advantages, and an explicit Account of the best Methods, of draining the several Kinds of Marshy and Moory Lands.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

**B**EING a constant reader of your *Museum Rusticum*, and having a high opinion of the utility of such a work, I was sorry to find the regular Monthly Publication (for November last) delayed, for \* want of a sufficient supply of materials. The following observations are

\* We are much obliged to R. T. for his generous sentiments with respect to the *Museum Rusticum*. But we have the pleasure of assuring him, the delay, for want of proper matter, was not owing to the loss of correspondence, but to the sudden illness and death of one of the gentlemen assisting in the work; by which means a part of the papers, for the ensuing month, that was in his hands, could not be obtained in due time by the other editors. On the contrary, we have received valuable pieces, and have the assu-

are entirely at your disposal, either for public or private use, as to your judgment shall seem most meet. If destined (by your candour) for the former, happy shall I be, if they prove (in the least degree) useful: if (by your friendly judgment) for the latter, most thankful, for the kind oblivion bestowed upon them.

It is with great pleasure I felicitate my native country, on that happy spirit for improvements in agriculture, so visible amongst all ranks of people, from the first nobleman in the land, down to the lowest farmer. A spirit productive of many and great advantages, both to the public, and also to private persons; but to none (in my opinion) so particularly useful, as to country gentlemen; who, residing constantly upon their estates, without the happiness of a profession to engage their attention, and employ their leisure hours, must (without a turn to this kind of amusement) loiter away many dull irksome days in tiresome indolence; or be liable to that just, but sarcastical application of Goliath's curse, by Mr. Addison, "of being given to the beasts of the field and the fowls of the air." But this happy turn will furnish them with an employ, not only very profitable, but also rational, innocent, and entertaining. An employ that will make them contributors to the national wealth and prosperity, excellent stewards and benefactors to their own estates and families, and the truest friends to the industrious poor. For a constant supply of labour, is the very best relief of *their* necessities, and the most useful way of bestowing *that kind* of charity. As the profit will be great, so will the pleasure

of a future supply, from several persons of distinguished abilities, as well with respect to agriculture as other subjects, who did not before favour us with their correspondence.

We must acknowledge our further obligations to R. T. for this particular communication: which we think highly deserving a place in any collection, calculated to promote the improvement of land. Instructions so full and clear, cannot fail to render it serviceable to the farmer; and it will have an additional recommendation to gentlemen, from the liberal spirit and manner with which they are delivered. R. E. O. A.



be also; especially, from that species of improvement which I mean to recommend in this letter, viz. *the draining of lands*. For this is something like a new creation (if I may be allowed the expression), when the dreary unprofitable fens, or the shaking impervious bogs, where the bittern wont—with bill ingulph— to shake the sounding marsh—are changed into beautiful meads, verdant pastures, or yellow harvests, yielding abundantly the necessaries, comforts, and conveniencies of life: to which I may add, how conducive to the healthfulness of the situation and neighbourhood too, from no less authority than Dr. Armstrong's; who (in his admirable poem, *The Art of preserving Health*) gives this excellent advice to those, whose lots are fallen in too moist a soil and clime:

“ But if the raw and oozy heaven offend,  
 “ Correct the soil, and dry the sources up  
 “ Of wat’ry exhalation: wide and deep  
 “ Conduct your trenches thro’ the spouting bog;  
 “ Solicitous, with all your winding arts,  
 “ Betray th’ unwilling lake into the stream.”

So much by way of preface to my subject. I shall now, in as plain a manner as possible, and as concise as perspicuity will allow me, mention the several kinds of land, upon which I have made experiments in draining; the different kinds of drains I have made use of for that purpose; and the pleasing effects, (both as to pleasure and profit) which I have happily experienced by such practice.

The first experiment, I made, was upon a piece of ground (of about four or five acres) in the front of my house, of the springy kind; where the waters (collected from the rains and dews in a large plain of dry land above) broke out upon the declivity of the hill; and, not having proper drains and channels to carry them away, had (by long overflowing) rendered the ground so soft and boggy, as not to allow the tread of any sort of cattle (unless in very

severe frosts); and thereby made it intirely uselefs, and also very disagreeable to the eye. I took the opportunity of a very hard and lasting frost, to carry on a large quantity of stones for making the intended drains: which were laid out in the following manner. A main drain, or trench, was made through the middle of the ground, from a small rivulet (into which it was to empty itself), to a little above where the springs made their first appearance: from thence two drains (one on each side) were carried along the side of the hill to the two extreme parts of the ground, emptying themselves into the head of the first-mentioned drain, which was only made about three feet deep till near the top of it. The branches or side drains were better than six feet; as I hoped thereby to have cut off all the springs: but the declivity of the land being considerable, I was obliged to add two drains more below: as some of the springs had escaped under the bottoms of the highest branches. I made the drains in the following manner. The bottoms were flagged with a thin tender stone (of no other use); the sides walled with rubbish stone (the walls being about five inches asunder, and five inches high); and the tops covered with a stronger kind of rubbish stone. Upon the covers, I laid rushes and reeds, (the then *only* produce of the ground) to prevent any dirt or soil from getting through the openings of them into the drains; and, lastly, I filled them up with the most porous substances, dug out to near the height of the surface.

I began this work about the end of March; and had finished it about the end of August. I very soon found the good effects of my labour, the ground being grown so hard and solid before the middle of October, that I was able to carry on, *with carts*, a very large heap of compost, which I had prepared ready for that purpose; consisting of fresh litter from the stables, virgin earth, street dirt, coal ashes, and lime, well incorporated together by frequent turnings. The next summer most agreeably surpris'd me with as fine a crop of hay, both in respect of quantity and quality, as any of the neighbouring grounds could boast, (above three  
loads



loads to the acre): and the aftermath, or second crop, was full as extraordinary as the first. In order to know the profit of the latter exactly, I hurdled it off in small parcels: and having taken in cattle by the week, found the profit better than twenty shillings a statute acre. This ground has kept improving, ever since; and now affords me three crops every year; viz. spring pasturage for my milch-cows and early feeders, a most plentiful crop of good hay, and an excellent aftermath; without having had any superinduction bestowed upon it since the first, which is eleven years ago.—When stones cannot be conveniently had, the common flat tiles for the bottoms, and the common brick for the sides, and covers of the drains, will do very well; and, as bricks are more expeditiously laid than the rubbish-stones, I think they will be full as cheap, if proper clay, and fuel for burning them, can be procured upon easy terms. The expence of draining this piece of ground, was about five pounds *per* acre. I have drained many acres of the same kind of land since, with equal success; and at a much less expence.—Another kind of land, which has fallen within my practice of draining, is what *I call* the four spongy land; where there is upon the surface a tolerable good mould, for six or seven inches deep, and below that a stiff clay, that will not permit any water to pass through it; by which means, the soil above is so soaked and chilled, with a constant surcharge of water, that it is not able to produce anything but rushes, and all the worst species of aquatic weeds. As this kind of land is often nearly level, or but gently declining, the first step I take, is (by levelling) to find the greatest fall, I can get within any reasonable distance. Then, by the means of iron rods, (such as are used in boring for coals) with a bitt or iron scoop at the bottom, I try in several places the depth of the clayey stratum, which so obstructs the passage of the water; and also what the natures of the several strata below it are, till I come as low as the level, where I propose to begin my drain.—If I find, in such search, any gravel, sand, soft rock, pinnel, or other porous substance, I begin the good work immediately, and with

with full assurance of success: making a good stone or brick drain (as before described) through the lowest part of the ground intended to be drained; and then filling it up with all the light porous substances, that arise in the digging of it, or any rubbish that can be conveniently procured; taking great care that none of the clay, or hard substances, be thrown in again; and that the top and sides of the drain be left lower than the rest of the land; that the winter rains may easily descend to it, and so pass (as through a sieve) into the channel prepared to receive them.—If there be any low parts in the piece of ground, from whence the rain-water cannot descend to the main drain, small pebble, or wood drains, should be made from those low parts into it: taking care to fill them up with some rubbish or light mould.—The clay, which is dug out, may be converted (either by burning or laying up in heaps with quicklime) into a most excellent tillage, either for corn or grass-land, for the improvement of the same ground, or any other where it is *more* wanted. For the fertility of *such* land, after *such* draining, is greater than can be well imagined by those, who have not tried it, even without any further improvement. I generally (indeed) set on lime immediately afterwards, if the season of the year be proper for it: which, I say (from experience), is from the middle of April, to the middle of July; being certain, (notwithstanding some great authorities, and the common practice are against me) that twenty bushels set upon grass-land, during that season, are more than equal to thirty laid on in the autumn, or winter seasons. About an hundred and sixty bushels to an acre, are a proper dressing.—The last kind of land, of which I shall now treat, is the *black peat or moorish land*; many thousand acres of which, in this kingdom, are now intirely uselefs, tho' capable of being improved to great advantage. Nay, I will venture to affirm, that there is scarcely any so bad, but that it might (by proper means, and due industry) be converted to some useful purpose. For which assertion, I have a happy authority, in that beautiful testimonial of industry, given by Virgil, in his fourth Georgic, to the  
old



old Corycian farmer. If these kinds of land be nearly upon a level, I use the precautions mentioned in the last article; and, if I find my level will carry me below, or to the bottom of this black moorish or peat-earth, I do not regard the depth of my drains, as the digging is very easy, and what is thrown out will nearly pay the expence, by being either dried into peat for fuel, or burnt into ashes; which (if properly managed) are an excellent dressing, either for spring-corn, or grafs-land. In the draining of this kind of ground, I make one principal drain through the middle of the piece, (of stone or bricks, as before mentioned); and, at about every eighty or a hundred yards, branches from it. These I make rather better than two feet wide at the top; and continue them nearly of the same width, till within eight or nine inches of the bottom. Then, with a spade (about nine inches broad at the top, and narrowing down to three inches) I make a lower drain; and, upon the sides or ledges (formed by the narrowing of it), lay large heath-fods, cut square, and exactly to the width of the upper part: by which means, a cavity is left for the water to run in. Upon those fods or covers, I throw brush-wood, or any kind of light trumpery: and, lastly, I fill it up with the smallest of the black soil thrown out.—Such is the preserving nature of this black peat or earth, to all vegetables buried in it, that there is no doubt, but drains of this last kind will endure for ever if they be laid deep enough. After the ground is drained and levelled, marl (if to be had near) should be laid on; if not, sand, gravel, or any kind of light earth. If the first, no other superinduction will be required; but if any of the latter, over it, should be spread, a cover of some of the finest black mould, that is pretty free from any strings or fibres; and then a compost made of horse dung, coal ashes, earth, or clay and lime; and, lastly, it should be laid down either with grafs-seeds alone, or with barley (or oats) and grafs-seeds. I laid down a piece (drained and managed as above mentioned) about the beginning of August last, with white clover, yellow clover, and common hay-seeds, and though the season was so remarkably

markably dry and hot, yet the young plants came up very well, and very thick, and, in this present severe frost, it affords a verdure, not to be seen any where else in the neighbourhood; and the piece is constantly covered by my cattle; tempted by the look, and the sweet food it affords them. I am now preparing about five acres of the same kind of land, to be laid down with barley and grass-seeds in the spring; and hope (if the season proves favourable) to have a good crop of both. I had no marl (or even clay) near, so was obliged to make use of sand and gravel for my first stratum \*. I have great reason to fear I shall tire you, gentlemen, with even reading over so long a letter: but you know upon what terms you receive it; and, therefore, before I conclude, I will beg leave to mention one other advantage, that may sometimes be obtained by draining lands, from which there is a pretty good descent; which is, that the waters so taken away, may be made use of for watering some dry lands upon the declivities of the bottoms below; and thereby making them amazingly fruitful. This improvement, from watering, was never more effectually proved than in the dry and steep hill-sides near Halifax in Yorkshire; where a naturally barren and shallow soil is made to enjoy an early, nay almost a perpetual verdure, by the sole advantage of watering at proper seasons, and with proper quantities. — I have often, with great pleasure, observed, that industrious set of people, hasting from their looms (their usual employ); and directing several little

\* I never break any more of the surface of this black peat-land than is necessary for levelling of it: as the heath and ling prevent the stratum laid upon it from sinking too deep, and also the land from poaching with cattle, or cutting up with carriages, till a proper firm surface be formed above, and by that time the ling, &c. begin to decay, and turn into a good soil. — If the ling or heath be long, I mow it. — Paring and burning are (I know) generally recommended; but the ashes arising from thence are not half so good as those, which may be procured by burning the solid black earth or peat, which is thrown out of the drains, and from the parts, which are obliged to be taken away in levelling.

bubbling



bubbling streams of water from one part of their little farm to another, where its cooling and friendly refreshment was most wanted: and, I could not upon those occasions help recollecting those beautiful lines of Virgil:

*Et, cum exustus Ager morientibus æstuat herbis,  
Ecce, supercilio cliuosi tramitis undam  
Elicit: illa cadens rancum per leuia murmur  
Saxa ciet, scatebrisque arentia temperat arua.*

I hope you will excuse this inconsequential digression, and believe me to be,

GENTLEMEN,

Lancashire,  
Jan. 9, 1766.

Your constant reader,  
and obedient servant,  
R. T.

#### NUMBER XXI.

*Two Letters on the Question, Whether the Culture of Burnet be advantageous? Sent in Consequence of a Desire, express'd in one of Mago's Letters formerly published.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

**M**Y present engagements will not permit me to comply with Mago's request (whose sentiments I properly revere) otherwise than just informing him and the public, in general terms, without entering into any of the reigning disputes, or a critical detail; that I have cultivated burnet with attention, due to a plant which promised (from various accounts \*) so valuable an acquisition in agriculture: but at the same time must with reluctance

\* I have also a personal knowledge of Mr. Rocque, whose attention and perseverance, in trials of husbandry, entitles him to public thanks.

confess it is not deserving any exalted character, but rather on the contrary. It is in no degree to be compared in value to the *Trifolium purpureum majus* of Ray; in Shropshire called the *common clover*, which is cultivated at half the expence, and superior by far in every respect; and I hope, there is no doubt, but lucern will merit the regard of the public.

Every new hypothesis has its florid advocates; but those which communicate to the public through the *Museum Rusticum*, (a work so laudably calculated for public utility) ought to be doubly watchful in preserving such uniform attention, as not to applaud or condemn upon the principle of novelty, when well-tried experiments must be the only criterion at last from whence we must draw our conclusions.

Heretofore I have declared my attachment to agriculture. For amongst the various branches of knowledge, few can boast more rational allurements. Even in the earliest time it had its noble votaries; and it surely is worthy our admiration and praise. It naturally exalts our comprehension; and wonderfully raises our adoration towards that author, “in whom we live, and move, and have our being.”

I am, GENTLEMEN,

Shropshire, near Shrewsbury, Your humble servant,

Feb. 24, 1766.

F. R. \*

To

\* We are obliged to F. R. for this communication, in compliance with Mago's request, in his letter, No. 5. p. 265. and are satisfied of the truth of what he advances, as far as respects his own observations and trials. We think it is proper, in all new undecided points, to publish every thing that comes with the sanction of candour and veracity, on each side the question. But we are now convinced, nevertheless, that the culture of burnet is greatly advantageous, under many circumstances, and in most places. The account given of it by Mr. —, who cultivated thirty-seven acres, and gained the first premium for the last year from the Society;—that given by Mr. Baldwin, who gained the second premium for cultivating eighteen acres;—and another, given by Mr. Lamb, in a letter to the Society, clearly evince, beyond all doubt, the great utility of this plant properly cultivated.



*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

**N**OT receiving your last publication till the 15th instant, nor that of December till about the same time in January last, the cause of which I shall enquire into, as I used to receive them by the person who distributes the Canterbury news-papers in this part of the country, about three or four days after they came out, has put it out of my power to oblige Mago. However, I hope the first opportunity to send you as particular an account concerning the burnet, as I possibly can. In the mean time I wish the advocates for, or against it, would not be too hasty,

cultivated. We hope the public will very soon see these letters at large: and therefore we shall say only in brief here on this occasion, that they show the produce of burnet, both in hay and seed, is extremely great; that besides the hay it affords pasturage, not only in autumn and spring, but in the depth of winter;—that it maintains its growth and verdure in the greatest drought and severe frost;—that in general cattle and sheep are fond of it, and grow fat by it;—that the milk, cream, and butter of cows, which feed on it, are uncommonly good in quality, and great in quantity: the effects of the burnet in this particular being such, that when the cows are almost gone dry in droughty or frosty weather, they are in a few days, by feeding on the green burnet, restored to their full meal of milk;—and that burnet will flourish and afford large crops on gravelly and shaley soils, where other kinds of grasses cannot be made to answer. These are qualities of the greatest importance, and that they exist in burnet, is evident from the facts contained in the above accounts, and testified likewise by many other trials, of which we have authentic information. The last of these qualities, that is to say, the disposition to grow on land sterile as to the other kinds of herbs, called grasses, as well the several true species as those named so from their application to the purpose of fodder, is so interesting, that the committee of agriculture have recommended it to the Society to give a future premium for the cultivating burnet on land of the least reputed value. We hope, therefore, our correspondent *F. R.* notwithstanding some unsuccessful trials, will suspend his opinion of this plant, till he sees the letters here mentioned: which we hope will afford him sufficient ground to think better of it. R. O.

nor too warm. I am inclined at present to believe, that it may be propagated to advantage; but as time will not permit me to say more, conclude,

GENTLEMEN,

Feb. 22, 1766.

Your most humble servant,  
The KENTISHMAN.

## NUMBER XXII.

*Observations on the public Advantages of selling Corn by Weight, instead of Measure.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

YOUR correspondent E. S. after having very clearly proved, not only that the increase of the price of corn has not been occasioned by exportation; but that it has been so much restrained and lessened by the bounty, as to be, *communibus annis*, only half the value of other things; modestly puts the question, Why the poor are really distressed, and corn reckoned so very dear? I do not look upon myself as equal to the answer of so important a query: but as a sincere and disinterested friend of agriculture, the servants, or, considering their comparative toil with that of other employments, the slaves, I may say, of which have been, of late, represented as gaining profit beyond their claim, I have taken the liberty of adding my mite of opinion in their defence. A bad harvest in the year 1764, and a great demand afterwards for wheat abroad, drained us of the very dross of that commodity, as a community, to a very beneficial degree: for I regard the very lucrative benefits arising from exportation, to be so greatly superior to the injury now and then done us by the advance from it of the price at home, that, with all submission to the legislature, I think it ought to be most cautiously and tenderly interfered with. The consequence of this drain was,

1

that



that at the last harvest, so little old wheat remained, that the new was obliged to be immediately thrashed : and I saw some at the millers drying in the air to be hardened for the mill. Yet so good and plentiful was this harvest in wheat, that, in spite of the want at home, and demand abroad since that time, wheat has from Michaelmas to this time, in this and the neighbouring markets, been, with little variation, at ten pounds *per* load, five quarters to the load. The barley, oats, beans, and peas in this harvest, were in general so extremely bad, as to make a considerable deduction upon the profits of the wheat : and, as, in this county, eight pounds *per* load is thought a fair price on all sides, I believe the additional forty shillings *per* load is not more than adequate to the deficiency of the other crops. The profit, therefore, to the farmer this year, is not, upon the whole, above his claim : and the price to the consumer is less, from the greater value of the commodity. Wheat, to be fairly estimated, should be valued by the flour it will produce ; that is, should be always sold by weight. The quantity and quality would always then be in the same proportion : and the assize of bread, or, what is the same, the price of flour, would not then be in too high a proportion to that of wheat. Bad wheat will fill the bushel as well as good : but the weight will be in proportion to the intrinsic goodness. The wheat this year is so firm, close, full, and heavy, that it is, at the same price, one pound *per* load more valuable : and, consequently, like every other commodity, more cheap than that of last year. I heard the overseer of a work-house, in one of the largest parishes in England, say, he was surprised, how much cheaper it was, from the greater quantity of flour it produced, he maintained his poor cheaper this winter than he did the last, though he paid, for his wheat, the same price. My conclusion is, therefore, that, by our selling wheat by measure, and not by weight, and the assize of bread being in general regulated by this method of sale, the poor must suffer, for the benefit, in some degree, of the farmer, if the wheat be bad ; and, for the benefit of the miller, in a great degree,

if

if the wheat is good : I say, only in some degree for the benefit of the farmer, because every miller, like every retail dealer, will very justly endeavour to regulate his price by the produce of his commodity, as well as its original wholesale value.

The millers, I allow, before the last harvest, from the badness and price of wheat, could scarcely pay their charges ; but, at present, how much they receive more than their due profit, allowing even for the chance of years, will appear from the following calculation. A bushel of wheat, at ten pounds *per* load, is five shillings : of this the miller makes three pecks of flour, which he sells for six shillings and eight-pence : and of the pollard, and bran, makes at least four-pence. Thus one bushel of wheat, at five shillings, is retailed at seven shillings when ground : and one load of wheat, at ten pounds, is sold out at fourteen pounds. They are so careful of their trade, that of the broad bran, from a gentleman's flour, which they will not dress further, they make of their own three sorts, 1st, best pollard, sold at one shilling and eight-pence *per* bushel ; 2d, worst pollard, at ten-pence *per* bushel ; 3d, coarse bran, at one shilling *per* bushel. Such is their profit when wheat weighs its full weight, that is, when the bushel is sixty-five pound ; with the still greater addition of more profit, when it overweighs ; which the wheat of this year in general must considerably do. Let the saddle then go upon the right horse. Let not the farmer be thought to grind the poor. Could I joke on so serious a subject, I would say, they are ground at another mill. Let no one be able to grind them. Let the weight or goodness of wheat determine its price, and ultimately that of the affize of bread : and if the poor be not redressed, they will be in some degree relieved.

To redress them at the expence of the farmer alone, is impracticable. He suffers with them by the great advance of every other necessary, and, of all dear necessities, sells by half the cheapest, while the price of the culture of it is daily increasing to him. To redress them at the expence of the community, would be to attempt an alteration



tion of our manners. As a state we are miserably poor: as particulars, many of us enormously rich; and all of us vain, luxurious, and expensive. What can be cheap in a country where the public expence is so very great; private œconomy so very little; and every frivolous art more profitable than rustic labour! Prosperity, as the French encomiast of agriculture, the Marquis de Mirebeau, observes, is to states, as maturity to the fruits of the earth. It not only announces their putrefaction, but renders it almost necessary. That we may not verify this dreadful but just sentiment; and that your labours may contribute to render the chance of it less applicable to this distressed and powerful kingdom; is the sincere prayer of,

GENTLEMEN,

Essex, Braintree,  
Feb. 17, 1766.

Your friend,  
C.

### NUMBER XXIII.

*Remarks on the Premium, offered by the London Society, for a Machine for slicing Turneps; and Agricola's Letter on that Subject, published in Number 27.*

To Mr. NEWBERRY.

SIR,

UPON looking over the premiums proposed by the Society for the encouragement of arts, &c. I was not a little surpris'd at finding one offer'd for a machine for slicing turneps, it being so contrary both to our received notions and common practice in feeding them.

I was in hopes, however, upon seeing a letter on that subject in your *Museum Rusticum* for December last from your correspondent *Agricola*, to have been convinc'd of its utility; but although I read over his arguments attentively, yet I cannot say they gave me the satisfaction I expected.

Now

Now if the danger of choaking, as both *Agricola* and Mr. *Baker* agree, arises from the small turneps, and none at all from the large ones, I should apprehend the cutting the latter into small pieces, and which may perchance be angular, must (as horned-cattle are known to eat very greedily, and to swallow their food whole and unafficated) rather increase the danger, than contribute any way to lessen it. Accidents however of this kind are not, I believe, very frequent, nor have farmers often suffered by them; since whenever cattle are feeding upon turneps, there is, for the most part, some person attending upon them; and in case of such an accident, they may easily be relieved by the assistance of a rope made for that purpose, and which it is always adviseable to have in readiness: this, however, I have never had occasion to make use of within the space of three or four years, in which I have fed milch-cows with turneps.

And as to the waste made of them by fat cattle, whether sheep or oxen, when given to them whole, that seems to me to be rather imaginary than real, since what is left by them is usually eaten up by lean stock succeeding them. But whatever the waste may be, it will not, I apprehend, be at all lessened by cutting them; since, when given them abroad in this state, they will be more liable to be dirtied and injured by the weather, than when dispersed about the pastures whole. Nor does it appear, that Mr. *Baker* himself recommended slicing turneps for any other than stall-fed bullocks, much less for sheep not under confinement. And indeed it is evident, from the quantity used, that he did not prepare them in this manner for all his stock, but for that part of it only which was housed.

Such a machine as this would undoubtedly be worthy the attention of the public, and save a great deal of labour, could the expediency of the practice be first manifested; but as many sensible farmers, who have had the largest experience in the article of turneps, are no way convinced thereof, yea, rather apprehend the danger of *choaking* would be increased thereby, whilst the expence of providing  
thus



thus for a large flock (as the labour would be great even with the help of such a machine, and the carriage doubled, by bringing them first home to be cut, and then carrying them out to the stock) would be much more considerable than any saving from what might otherwise be wasted, this practice is not likely to be generally adopted. Nor is it indeed to be wished it should, since it is much more beneficial to the land to feed them where they grow, if the soil be dry enough to bear the stock, and the weather favourable. So that, upon the whole, if any benefit is likely to arise from a machine of this kind, it must be wholly confined to stall-fed beasts, and can never, with any advantage, be extended to unhoused cattle in general.

It is with concern I differ in any thing from your ingenious correspondent *Agricola*, and with more, that I cannot bring my sentiments on this head to square with those of the worthy members of the Society above mentioned, whose truly laudable and public-spirited undertakings I shall ever admire, and be a hearty well-wisher to; but it may, perhaps, be owing to my not sufficiently comprehending \* their scheme; which, if it should be the case, I shall readily, upon a farther explication, retract my mistake as soon as convinced of its being one; who am,

S I R,

Feb. 24, 1766.

Your constant reader,

NORF-CANT.

N U M-

\* We are apt to believe, that our correspondent, who here signs himself *Norf-Cant*, does not well comprehend the meaning of the Society, in offering the premium he seems to censure: and this appears to result from his not considering the terms of the advertisement, but confounding with it some passages in *Agricola's* letter, published in Number 28 of our *Museum*, which he mentions. Our ground for this conjecture is, that his objections to the premium for a machine, for slicing turneps, are drawn from his condemnation to the practice; by which it may be inferred, that he considers that the Society's intention, in offering the premium, was to recommend such practice. But that is not the fact. The Society have not proposed any premium for slicing turneps; but

## NUMBER XXIV.

*Remarks on the Benefit, which would arise from the completing the Catalogue of English Weeds, published in Number 25 : With Observations on certain Kinds : And on the Advantages of rendering general, through the Channel of the Museum Rusticum, useful Matters, that may be before known in some particular Places only.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

I Think the public are much obliged to your correspondent, who lately gave us a list of *weeds*. For, in the *natural*, as well as *moral world*, it is often of as much consequence, to know what we should *avoid*, as what we

only for the invention of a machine, which will perform that operation with great ease and dispatch: nor have they had it in any manner before them, to decide, whether feeding cattle and sheep with whole or sliced turneps in general, or in any particular cases, was a better practice. The only premises requisite for their consideration, in order to judge whether the establishing this premium was a fit measure, or not, were, whether the slicing turneps was, or was not a frequent and common practice; and whether it was not at present done entirely by the hand, without the assistance of a machine; and of the affirmative of these two facts, they had a very satisfactory evidence, from many gentlemen of their own body; who, residing occasionally in various parts of the country, had an opportunity of knowing what was done in them. This being admitted, it was certain that the offering the premium for a machine, which would do this work with great ease and expedition, had a manifest tendency to procure the means of an advantage to those, who do it at present with much trouble, and some hazard to their people.

As to *Norf-Cant's* remarks, on the arguments produced by *Agricola*, in favour of the practice of slicing turneps for cattle, &c. we shall leave it to *Agricola* himself, to comment on them in his turn, if he thinks proper. For, as to ourselves, we shall avoid interfering in any disputes respecting matter of opinion: unless where, by furnishing accounts of facts, or supplying other information, not within the reach of common observation, we can materially elucidate any point in question. E. O.

should



should *persue*; what we should *root out*, as what we should *cultivate*. It has, I think, been somewhere observed, that the name *weeds* is often *relative*. A plant placed where it should not be, may be a *weed*; but, placed where it should, a valuable *subject of cultivation*.

You have justly remarked, on your correspondent's list, that it is not so perfect \*, as one would wish; and that a more particular description may make it much more so. Good plates also seem necessary. I have been thought, gentlemen, no great admirer of the execution of Mr. *Mills's* new and complete system of agriculture; and, I must confess, after a fair and laborious examination, I must think him an *hasty*, and *very imperfect* compiler, especially when the price of his work is considered. Nevertheless, as I have always great pleasure in giving just praise, I declare, I think, his account of *weeds* is the best by far, that I have seen.

It would be of great use, towards completing an useful and perfect list of these, to collect the various vulgar names, by which the several species of weeds go in different counties of *England*; and the different methods of extirpating them.

At present, I shall only make a few observations on two particulars, mentioned by your worthy correspondent, who sent you the list above mentioned.

I. As to *seagrim*, repeated experience convinces me, that pulling up by hand is insufficient to extirpate it. A quan-

\* We have, by no means, said, or intimated, that the list of weeds here mentioned is imperfect, with respect to what it was intended to be. All that was meant by the words, "But we think it would contribute much to the advantage, the public may receive from it, if descriptions of the several plants suited to common readers were to be added, &c." was, that such an addition would be a supplemental benefit; though no part of the intention of the ingenious author in the list he sent. It was not, therefore, to point out any defect, in what was already communicated, but to incite him, as he is peculiarly qualified for it, to lend his assistance in this useful addition; which we could not in any other way with propriety ask, that we dropt this hint.  
R. E. O.

tity of small roots sufficient to continue its growth, being left at *almost* every trial. I have taken much notice of this weed in several places, especially where the land is lett dear, since I wrote my remarks to you concerning it. This weed grows in many of the grounds about *Leeds* and *Wakefield*; where the land is let for three and four pounds *per acre per annum*. I have observed, that large bundles of this weed, gathered by hand, are every year seen thrown into the lanes; and there appears no diminution of the weed in the pastures. The same may be observed of several of the grounds on that side of *York*, which lies towards *Sheriff-Hutton*.

I took notice, however, of one close, which seemed wholly free from this detestable *weed*, while all those around were full of it. I saw the occupier come out of the field, and join me in the high road. Glad of such an opportunity, of information, I asked him the reason of this singularity; and though he seemed not *very intelligent*, he ascribed it, to the grounds being for many years a sheep-pasture: though he added, that sheep will seldom eat this weed, unless when they are very *hungry*; and the weed *tender*, viz. in spring.

I am not, however, gentlemen, convinced by this instance, that sheep are a *sovereign cure* for this *evil*; since many of the closes around that in question, appear to be as constantly sheep-pastures.

II. As to *heart-clover*, I know not why your correspondent should make it a *weed*; unless in a relative sense: as sometimes taking up a space, in which a better plant might grow. For, in itself, it appears a valuable kind of clover. Mr. *Cook's* gardener assures me, that it is a grass, of which, both *green* and *dried*, *sheep* and *horses* are extremely fond. He has gathered and sowed some of it; and had a prodigious increase. He has been so good as to communicate some of the seed to me; and I propose to make the trial, and will impart the result to you. I wish Mr. *Wynne Baker* had been a little more particular in his description of the *strawberry trefoil*, and wish him success in the culture.

He



He does not say what the *colour* of the *flower* is; and, as there is no mention of it in the edition of Mr. *Miller's* Dictionary, which is by me, I cannot judge whether it is any of the smaller kinds of trefoil, which I have described to you.

Of all the unreasonable complaints that have been made against parts of your work, I think none is *more ridiculous* than that which pretends, that you should not admit accounts of things already well known in some places. Whereas, one obvious use of your publication is, *effectually to recommend to use in places where they are not known, or not sufficiently noticed and used, things, of which the known use in other places renders them familiar there.*

I will give you, gentlemen, a strong instance in point, as the lawyers say.

Who, in the South, and most great towns, knows not the advantage of carrying water and milk in buckets, fastened to the extremities of a yoke, which fitted to the shoulders, and bolstered, enables the labourer to carry a much greater quantity with far greater ease? And yet, in all this county, and many others, this method is so little regarded, that all the milk and water, except what is carried on asses, is carried on people's heads. How many inconveniencies follow hence! The stoutest servants, and especially women, complain of this hardship: and their masters never think of a remedy. The danger of throwing down and wasting the liquor, is very great. The injury to the health, and strength of the carrier, is still much greater. The vessel is usually raised by strength of arms on the breast; and then on the head of the bearer. What strains, what head-achs, what pains in the breast, hence, arise, especially to women, who are frequently most unfit for such work! What loss to the public of healthful breeding wives! A woman servant of a tenant of mine, complained the other day, that she must either quit her place, or break the *skeel*; the vessel in which water is brought from the well: for it was impossible, for her to bring water in a vessel, which, by continually having water soaked into it,

it, was alone a sufficient weight. I enquired what quantity of water the vessel held, and was answered by an impartial and skilful person, "Probably twenty quarts." What a weight, besides the vessel itself, to be raised and carried on the head by a woman! If the farmers would only be at the expence of buying buckets, and a yoke, they would soon reimburse it by the lower wages servants would take; and the more work they would get done.

East-Newton, I am, GENTLEMEN, as usual, your's, &c.

Feb. 23, 1766.

T. COMBER.

### NUMBER XXV.

*An Account of the comparative Advantages of cultivating Lucern, on the drill or broad-cast Methods; for which the Society for promoting Arts, &c. adjudged their Premium of a Gold Medal\*.*

GENTLEMEN,

**T**HE farm on which the following experiments were made, is a strong clay; a soil, in the opinion of all † writers in agriculture, the most unfriendly to lucern.

Encou-

\* The Society for promoting arts, &c. after adjudging their premium of a gold medal, to the gentleman, who sent this to them, came to a resolution, to desire him to publish it: which, he accordingly thought fit to do, in the Public Ledger of February 26th. But, in order to render more effectual the views of the Society in procuring such accounts, and for the satisfaction or benefit of those of our readers, into whose hands the Ledger of that day may not have fallen, which, as they mostly live in the country, we presume to be the far greatest part, we have thought proper to give it a place in our collection, as we shall likewise from time to time do, with respect to any others of a similar nature, published in the same manner. For we think, one of the principal means, of rendering the *Museum Rusticum* beneficial to the public, is the aiding that Society in diffusing and making general the discoveries they may, by their rewards and encouragement, produce or bring to light; it appearing, that, at present, they have not any other adequate opportunity of diffusing a due knowledge of what is communicated to them. R. O. E.

† This gentleman is a little mistaken in his assertion, that in the opinion of all writers, a strong clay is "the most unfriendly  
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Encouraged, however, by M. Lulin de Chateauvieux's experiments, the owner was tempted to try how the lucern would succeed when treated in the manner he proposes: and in the year 1761, he sowed a field of about three acres with lucern in drills, two feet asunder. During the first year, he caused it to be weeded carefully; and from the places where it grew too thick, he supplied those in which it had failed. After every weeding, he caused the intervals to be stirred with a horse-hoe, resembling M. Lulin's single cultivator, which manifestly revived the plants.

In 1762, the plants thrived greatly, being kept clean, and horse-hoed as in the former year; and the Society having published a premium for a comparative trial between lucern sown in broad-cast and in drills, he determined to try one part of that experiment on this field, and not to bestow on his lucern any manure whatever, or to give it any other help than the horse-hoe.

In 1763, the plants were arrived at a size to yield so full a crop as to maintain five horses, from the middle of May to the end of autumn, or about five months. These horses, though constantly worked very hard, had neither corn or hay given them during all this time; and yet they con-

"to lucern." For Mr. Rocque expressly says, in his practical treatise on lucern, that it "*will grow very well in clay land, provided the ground works well.*" And that "*the difficulty with relation to such lands, lies in the harrowing in dry weather, unless the season betwixt wet and cold be taken,*" to do that office. This difficulty of not being able to hoe or harrow, on account of a long drought, occurred to the gentleman himself, who gave this account, in the experiments begun by his gardener, in 1764: as it appears in the subsequent part of his account, *that the horse-hoe could not be made use of till late in the year: and the same happened again the next year, when the "drought of the summer kept the clay so hard, that the horse-hoe could not be used."* This account, therefore, agrees perfectly with, and has indeed verified, by the strongest instances, what Mr. Rocque advanced, with respect to the culture of lucern on clayey lands: and besides what relates to the determining the comparative advantages of the drill and broad-cast methods, with regard to lucern, it proves evidently, that lucern may be, in spite of all these difficulties, profitably cultivated in a strong clayey soil. E. O.

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tinued in strength and spirit, and grew fat. A horse which in May was so weak, and in so bad a state of health, that it was thought he could not live, soon recovered, when fed with lucern. The plants were in general between three feet and three feet and a half, at the first and second cutting. The plants made so many shoots, and these shoots branched so much, that in three weeks after every cutting, or sometimes sooner, the intervals quit disappeared; the whole field being so equally covered, that it looked as if sown in broad-cast. December 1763, and January and February 1764, having been uncommonly rainy, the water stood in some parts of the field; and though there was generally such a declivity as that it might have been carried off, he resolved to let it remain, in order to see what effect it would have on the lucern. When the lucern began to rise in the rest of the field, in spring, he found, that wherever the water had stood, the plants were killed. He supplied this loss by transplanting lucern, from other parts; and these plants thrived very well. By the continuance of the same treatment, the lucern remains in a very flourishing state: and retained a beautiful verdure and vigour, during the very great drought of this summer, 1765. It has yielded four cuttings every year, and sometimes five.

Having observed, in a root of lucern taken up in the winter, that the spring shoots had no connection or concern with the remains of the shoots of the preceding summer, but proceeded from numbers of little tubercles, with which the head of the root was set very thick; it appeared evident, that the plants could not sustain any damage, though covered with a depth of earth during the winter. This suggested a hint, that the intervals might be plowed as deep as possible early in the winter, turning the earth on the beds; and that, by letting the earth remain in this condition till spring, the clay, or strong soil in which the lucern grew, would be mellowed, or loosened, by the winter's frost and rain: and being harrowed smooth in February, the fresh lateral roots, shot out in the spring, would find a fine fresh mould to extend themselves in, which must  
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tend greatly to the benefit of the plants. This thought was confirmed by experiment: for the spring crop is amazingly vigorous ever since this practice was followed; and the shoots, though of great length, and most plentifully supplied with branches, are so strong, that no rain or wind lays them, even when they have stood to be in full bloom, as is the case with part of the first crop; the horses not being able to consume the lucern before part of it is necessarily in bloom. Another advantage, arising from this practice, is, that the grass which takes root near the plants, and which cannot be otherwise destroyed but by hand-hoeing, is killed by being so long covered with the earth laid on the beds.

In 1761, a spot of ground, of an exactly similar soil, was inclosed for a kitchen garden; and there being part of it, which was not wanted for other use, in the spring of 1762, it was sown with lucern in broad-cast as a counter experiment to the former. The warmth of the garden, and the partiality of the gardener to this method, who held the field experiments very cheap, gave his lucern every advantage that could be desired. It came up well, and was kept free from weeds; but it neither grew so fast nor so high as the lucern sown in drills. This difference became much more sensible during the second and third years: for, in 1764, the field lucern had got the start of it so far, that this did not rise to half the height, nor did it yield a quarter of the quantity of fodder; so that he thought it needless to prosecute the comparison further \*. Seeing  
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\* This contradicts Mr Rocque's opinion, who plainly says, page 18 of his practical treatise on lucern, that the lucern seed must be sown in *broad-cast, not in drills*; unless, as he says below, "*your spot of land is too small to use a harrow in: in that case you must sow it in drills, and keep it clean hoed.*" But Mr. Wynne Baker's account, (see page 334, Vol. V. of this work) entirely confirms what this gentleman's experiments have shewn. For, though the lucern, sown broad-cast, did in Mr. Baker's trial at first seem to exceed that in the drill way, yet the other soon gained upon it, and the broad-cast grew worse in such manner, that he is of opinion, the broad-cast crops will *diminish in propor-*

so very remarkable a difference between the lucern raised in drills, and that raised in broad-cast, he resolved to try what share of this advantage might be placed to the horse-hoe, and what to the distance at which the plants stood; which distance afforded the roots more room to extend in. With this view, in 1764, he sowed a neighbouring field in rows, two feet asunder, intending to horse-hoe one half, and to keep the other free from weeds by hand-hoeing only. The months of April, May, and June, of that year, were so dry, that the plants came up thin, and the clay was become so hard, that the horse-hoe could not be made use

*tion to the improvement of the drill crops; so that, in three years, the latter will treble its own produce of the first year, whereas, before that time, the broad-cast would be near, or quite destroyed by the natural grass: and this even although it was managed in the way practised by Mr. Rocque.* The difference, in favour of the drill method is indeed stronger in this gentleman's experiments than in Mr. Baker's, for, notwithstanding it was kept free from weeds by the gardener, "*who gave it every advantage that could be desired,*" it neither grew so fast nor so high, as that sown in drills, even the first year. In the second year, we see the difference was so much greater, also, than Mr. Baker found it in his trials, *that it appeared needless to prosecute the comparison further.* The two accounts do, however, so well correspond, both in the event of the trials; and the reason of such event, that they go very far towards proving, that the drill method ought, at least in general cases, to be preferred to the broad-cast. It is fair, nevertheless, to give the reasons, on which Mr. Rocque condemns the practice of drilling lucern, in his own words: which are these. "I do not approve of drilling the lucern: because the roots are too much confined in the drills. They say, it is to clean the lucern between the rows, that they drill it; but it is the want of knowing the nature of lucern: and it discourages the people from sowing it: drilling and hoeing being very expensive ways. The quickest and cheapest way is to sow it broad-cast, as you do clover; and by much the best: as the roots will stand nearly at equal distances one from another every way." Mr. Rocque was certainly mistaken in this notion of the confinement of the roots; and in some other particulars: but I have seen, on clayey ground, in Northamptonshire, a crop of lucern in much better condition the third year, though very little pains had been taken with it, than one could well expect consistent with the accounts both of Mr. Baker, and this gentleman who obtained the medal. R.



of till late in the year. Even with this disadvantage there was seen a manifest difference, in favour of the plants that were horse-hoed. The same difference was also observable in the spring of this year: but the uninterrupted drought of this summer has kept the clay so hard, that the horse-hoe could not be used.

Computing the rent of the land, and the utmost expence that can attend the horse-hoeings, and cuttings, it will be found, that feeding horses with lucern will be a great saving, when compared with the price of the hay and corn, which these horses must have necessarily consumed in the same time, being kept to equally hard labour.

## NUMBER XXVI.

*An Account of the Nature, Propagation, Uses, and very great Advantages of the Italian or Lombardy Poplar.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

SOME time ago, you favoured us, in your most useful and entertaining work, the *Museum Rusticum*, with the account of a tree called *Robinia*, which may be well stiled the vegetable giant of Siberia. As an acknowledgment of the pleasure, I had in reading that account, and from a motive of good-will to mankind, and to this country in general, I now send \* you an account of a tree, equally

\* We are extremely obliged to our correspondent, for this communication: especially, since it happens to come at a particularly seasonable time: as it affords, both a very material illustration, and confirmation, of what *Philosylva* has advanced, in his letter, published in our last number, respecting the private and public advantage of cultivating quick-growing trees. Indeed this tallies so much with the contents of that letter, it might have been reasonably suspected, that both were written by the same hand, or at least by two persons in concert with

equally curious and useful, and, perhaps, better adapted to the soil and climate of England.

The tree, I mean, is called in France, where it has been but lately introduced, though well known in Italy, and particularly Lombardy, the *Italian*, or *Lombardy* poplar. According to M. Pelé de St. Maurice, of the Royal Society of Agriculture for the district of Paris, "the tree is "vastly superior, in point of benefit, to all the other kinds "of poplar." He might, I think, have said, superior, in that respect, to almost all other kinds of forest-trees: as must, in my opinion, appear evident from his own account of it; which is as follows.

The Italian, or Lombardy poplar, is of very quick growth, easily multiplied, requires but little trouble or expence; and, in about fifteen years from the planting of it, yields a considerable profit. Other trees scarce begin to appear, when this has done its business, and ceased

each other, if we had not certain proof, that they came from different and distant quarters; and from gentlemen wholly ignorant of each other's transactions; and who, perhaps, have not the least acquaintance.

The reasons which Philoſylva has produced, in the letter above mentioned, to show the benefit, the public may receive from the extensive practice of planting, on marshy and waste lands, the quick-growing trees, such as the best kinds of willows and poplars, in the manner recommended by Mr. North, in his pamphlet on grasses and that subject, the tenor of which is greatly verified by this account of the Italian poplar, will, it is hoped, be one means of inducing the Society for promoting arts, &c. to consider of some method of encouraging a matter pregnant with so much benefit to the public. Especially as the private profit, which may accrue from it to the undertakers of such plantations, would, in all probability, render the endeavours of the Society more effectual in this case, than they can be expected to be with relation to the common forest-trees, for which they now offer premiums. A reference was formerly made from that Society, to their committee of agriculture, of the consideration of somewhat of the same nature: but this happening to be in the midst of much other business; and, at the time of year, when the establishment of new premiums is always discontinued, no progress was then made in it; and the matter has slept ever since. E. R. O.



to exist. These poplars are prodigies in nature, which one must see, to credit their existence. Some of them, at the age of only twelve years, are about thirty inches thick: a size, which the other kinds of poplar seldom attain to, before the age of thirty. This tree is more beautiful, straighter, and works more kindly than the French poplar. The timber of it is hard, and fit for every kind of carpenter's work. Some persons go so far as to say, that it will answer for masts. It is asserted, that thirty acres of this tree, fit for cutting, have often been sold in Italy for ninety thousand livres (about four thousand pounds sterling). Surely this is enough to prove the excellence of this tree above all others. The quick growth, and the great beauty of it, are very conspicuous on the banks of the canal of Montargis.

The Italian, or Lombardy poplar, has another advantage over other poplars in this, that the branches of it issue straight from the very body of the tree; and lie much closer to it, than in others, even so as to give it a pyramidal form.

It has been said, that the Italian, or Lombardy poplar, is easily multiplied. A branch, ten or twelve inches long, and an inch in circumference, fixed in a proper soil, will, in three years, become a tree eighteen feet high; and, in the mean time, will supply shoots enough to stock a nursery.

To form a nursery of these trees, the first thing to be done is, to chuse a rich and fresh soil, but not manured: because young trees always thrive the better for being transplanted into a better soil than that in which they were reared. Besides, dung generally abounds with large white worms, and other rapacious insects, to which young trees are an easy prey. The end of February is the properest season, for cutting off the branches to stock the nursery. These branches should be but of last year's growth: for older branches are not so good. The lower extremities of them should be cut with a slope; and a bud be left to each: as it is, from these buds, the roots generally spring; and, of course, the tree may be expected to take the sooner.

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The holes, to plant these branches in, should be twelve inches deep : and the branch should be buried so deep, as to be but one or two buds above ground, after the hole has been filled again. The shoots of the first year are not to be taken off : as they afford nourishment to the young tree. The third year, and every year after, the body is to be eased of some of its lowest branches : and the soil about the roots, should be stirred from time to time.

These trees may be transplanted from the nursery into any soil, that is not very dry or stony. The sides of rivulets, valleys, and other low grounds, where the soil is richest and freshest, seem most fit for this purpose. The trees there acquire the greatest beauty. But, in transplanting them, care is to be taken, not to bury them above an inch deeper than they were in the nursery. Many of them have been known to perish, through the folly and obstinacy of the country-people, who must needs lay the earth about their roots to the height of eighteen inches : whereas six inches are fully sufficient.

These trees will be worth two guineas a-piece, to cut into volutes, at the end of twenty years : so that, upon the whole, this poplar, in point of beauty, quickness of growth, and goodness of timber, would be to farmers an uncommon treasure. These trees may be cut down twice from off the same land, before most other kinds of timber-trees can be touched even once.

There are nurseries of this tree at Montargis, Nemours, Moret, Gron near Sens, and Monbar. The Marquis de Chambray, who has cultivated it, with success, at his estate of Chambray, near Fillieres in Normandy, takes a particular pleasure in distributing branches to propagate it with.

I am, GENTLEMEN, your's, &c.



## NUMBER XXVII.

*Directions for preparing domestic Wines, equal to, and resembling the best foreign; — for making a cheap and wholesome extemporaneous Kind of Small Beer from Melasses; — and for improving the British Imitation of Rum. With Observations on the private and public Utility of making domestic Wines, &c.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

AS I should be very desirous to contribute to the support of the *Museum Rusticum*, from which I have received much amusement, and, as I think, *improvement*, I here send you some recipes and observations, that I flatter myself may be useful, and consequently acceptable to part of your readers. I say, to part of your readers: because to others, they may possibly appear unimportant and trivial. But, agriculture excepted, there are only few subjects, which suit the taste of very great numbers of people: and, with respect to practical concerns, those, who happen themselves to be masters of any particular matter, are apt to suppose others are equally well acquainted with the same: and that no good is, therefore, done to the world, by the publication of it. But in miscellaneous works, like yours, the multitude must, in certain cases, allow a part to be appropriated to the use of the few: by which, each set of readers will, in their turn, reap the benefit: and instructions for performing, in a perfect manner, things that are of a common and simple nature, but not well understood in general, may be, in many cases, of very high utility.

This may be some apology for furnishing your *Museum*, with the following directions for making domestic wines; a very cheap, wholesome, and agreeable kind of small beer, and offering some hints relative to the improving the imitation of rum, in Great Britain.

As to the art of making wine, I think the rendering it more generally known, and practised here, may not only afford a convenience with regard to expence, and a security with regard to health, to private persons; but an advantage to the public, in the balance of trade: a principle, at present, overlooked: though, in a short time, it will probably be seen in a more interesting light.

I know it will be said, in answer to this, that as to the country whence we import a great part of our wine, the balance of trade is, at present, much in our favour: and I admit it may be so. But this is, probably, true only as to that one country: whereas we purchase wine of several: and I will take the liberty to assert, that whatever improvement tends to increase the importation of our own produce or manufactures, or to diminish the consumption of foreign commodities in a permanent manner, is necessarily conducive to the public good: notwithstanding any temporary specious reasons to the contrary. For though it is said, that this has limitations, and should be restricted, where the improvements may affect the interest of any country with whom we enjoy a beneficial commerce; lest, by giving umbrage, we may lose that commerce: yet, I have never been, hitherto, in the least convinced of the truth of this speculation: which, in fact, scarcely has better ground than the supposition of a possibility: as there are certainly two things wanting to render this reasoning just, with regard to any particular case; the one of which never exists at all, and the other very frequently may not. The first of these things, or that, which, I say, never exists, is, that the trade of any country with us, should be on a fixt and certain footing, as to the durability of our advantage: and the second, or what may not exist in any particular case, is, that the respective improvement, which may be the object of jealousy, should be of such a kind, and so circumstanced, as to excite the attention to, or admit the convenience of a change in the general system of the commercial affairs of that country with relation to us. For the circumstances, on which  
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mutual commerce is founded, are often so complicated in themselves, and so interwoven with the general policy and interest of the country, or the court which governs it, that no exterior cause can easily break the connection. As to the permanency of trade in any particular channel, we see nothing is so precarious; especially in the present conjuncture of affairs in Europe, when every court now makes it the object of attention. We some time ago possessed a very considerable trade in the Levant; where we exchanged our manufactures for silk, cotton, coffee, drugs, &c. produced there, or brought by caravans from the East. At present, the greatest part of that trade has left us; and is now carried on by the French; or flows in another current. We enjoyed the Spanish trade, likewise, with great advantages; much of which, also, the French have at present: and even the Portuguese trade, our now greatest source of gain, seems not very secure to us. Nor does it require great sagacity, to perceive a great commercial revolution, with regard to our own colonies, coming on very fast from the increase of their manufactures, and their spirit of independence. The commercial intercourse, therefore, with any country, is too sensibly fluctuating, to render it prudent to give up any domestic advantages of a perpetual nature to such speculative views, and the most certain means of making the balance of trade turn in our own favour, is, to lessen the national expence, by producing or manufacturing within ourselves, as many of the material articles of our consumption as we can. On this principle, therefore, as well as some others, I shall think, I am doing a service to the public, if I can contribute to the diminishing the consumption of foreign wine, or what is sold for such.

Among the various articles of foreign luxury, wine certainly makes one of the most capital; and yet, what with the taking such extreme great quantities, as oblige us to receive, as well the product of inferior, as good vintages; and what with adulteration, as well practised before the wine is imported hither, as after; we in general drink very indifferent natural wines, or very exceptionable arti-

ficial mixtures of liquors, called so. Though for these, we either pay great annual sums to foreign countries, or to those, who make it their business to impose upon us at home.

This is the more to be regretted : because we have it in our power wholly to avoid it : and, by a little attention and trouble to provide ourselves with wine, that is superior in flavour, cordial effect, wholesomeness, and every other quality, with a saving of at least fifty or sixty *per cent.* of the expence. The means, by which, I suggest it to be in our power to do this, is, by the domestic production of wine in our own families : which, were the art well known, and the advantages, as I have here enumerated them, well understood, could not surely fail to be a much more general practice than it is at present.

It may be said to appear from experience, that wine thus made here, is not so good as the foreign : and that, we find, in the instances of those, who have tried to introduce it, the success is not equal to my representation. To this, I answer, that experience has verified what I advance, in the few instances of those, who have made domestic wine with skill ; and kept it to be of a due age : without which, even foreign wine would not be good. But the reasons, why greater numbers do not succeed, is the want of knowledge ; a sordidness, with respect to expence ; or the drinking the wine before it be fit : which is almost universally the case. For, where this art has been practised without any of these disadvantages, such wine has been produced, as not only has equalled the foreign, in all general good qualities ; but has even been mistaken for several of the most valuable kinds, even by the most skilful judges.

The want of knowledge in the art of making domestic wine, being, therefore, one principal cause of the neglect of doing it more frequently, I shall here endeavour to remove it, by furnishing such instructions, as can scarcely fail to enable any attentive person to practise it, with ease and certainty. And, I am persuaded, that, to middling people, especially those living in villages and places remote from sea-ports,

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where it is difficult to procure even indifferent wine in small quantities, I shall do a material kindness: though the advantage of making domestic wines is, by no means, confined to such persons, or situations; but even all others might find their account in it, both with respect to expence and health.

I will, therefore, first give a recipe for making the most perfect wine, that can be produced, by composition, in this country. By composition, I mean, such as is not made of the simple native juice, of any one kind of fruit. But this kind is, indeed, in a great degree native, as the water added to the dry fruit is only, in fact, the restoration of what evaporated in the drying and ripening the fruit: and the produce of this process is, therefore, in reality, a natural wine, and superior to any, that can be made of the native juices of the fruits of our country; or perhaps equal to the best of those of any other. This recipe will serve, also, as a basis, for the showing afterwards how other, and cheaper kinds, may be made.

Take thirty gallons of soft water, either rain, or river water. It should be obtained in as clear a state as possible, but boiling is needless. Put this water into a vessel, at least, one-third bigger than will contain that quantity: and then add to it one hundred weight of Malaga raisins, grossly pickt from their stalks. Mix the whole well together, that the raisins may not remain clotted in lumps: and then cover it partly, but not intirely, with a linen cloth; and let it stand in a warm place, if the season be not hot. It will soon begin to ferment; and must be well stirred about, twice in twenty-four hours, for twelve or fourteen days. It must be then examined, by the taste, to try if the sweetness be nearly gone off: and if that be found so, and the fermentation be greatly abated, which will be perceived by the raisins beginning to lie quietly at the bottom, the fluid must be strained off; and pressed out of the raisins, first by the hand, and afterwards by a press, if such be easily procured. But, if there be no press, two boards may be used with the assistance of a large weight, or

other strong compressive force ; which must be continued as long as any fluid can be made to drop from the mass. The fluid, thus separated from the skins, or marc of the raisins, must be then put in a good sound wine cask, well dried and warmed, together with eight pounds of Lisbon sugar, and a little yeast : but some part of the liquor must be kept out, to be added, from time to time, as the abatement of the fermentation, that will come on again, may admit, without the wine rising out of the cask. In this state it must continue for a month, with the bung-hole open: and then, the whole of the liquor kept out, having been now put in the vessel, must be closely stopped up ; so that no air may enter : and in this state it must be kept for a year, or longer. At which time, it may be bottled off.

This wine may be drunk, and will be very good at the end of a year and half : but it will be much better, if kept longer : and will improve for four or five years. When it has a proper age, it will equal any of the strong cordial foreign wines : and may, by the addition of proper substances to flavour and colour it, be made to resemble them.

This is the most perfect kind, of what may be called artificial wine ; but others may be made cheaper. There are two methods of making a saving in the expence. The one is, to substitute, instead of the whole quantity of raisins here directed, a greater proportion of sugar : leaving out four pounds of raisins for one of sugar added : or the quantity of both sugar, and raisins, may be diminished ; and a proportion of clean malt-spirits added, when the bung of the cask is closed up. The use of distilled spirits, in this manner, is not so objectionable, as it may at first appear to persons, who are not acquainted with these matters. For such spirits will lose their fiery quality, and be rendered soft and mellow, by their incorporation with the oily part of the wine. And there is nothing more certain, than that the practice of using them is general in the preparation of all the foreign wines, for our market : and most particularly those stronger kinds, which are most esteemed by  
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Any other kind of large raisins, which are cheap, may be used, as well as the Malaga: and the thinner the skins, and the sweeter the pulp, the stronger will be the wine.

It has been practised formerly to bruise the raisins; but it is unnecessary with respect to the common sorts, as they will soon burst with the fermentation; and freely give out their contents. But there are some small kinds with tough skins, which, if employed for this purpose, should be bruised: or they will resist the penetration of the water. These kinds are not, however, so good for the purpose of making wine as the larger; or, at least, if they be chosen for any particular flavour, they may give the wine, there should be only a certain proportion mixt, added to some of the other kinds: and, in this case, they should be first bruised.

The practice of a double fermentation, as here directed, first of the raisins themselves, and afterwards of the sugar, is not the common method: and very good wine may be made, by fermenting both at the same time. But this method is, nevertheless, preferable; for it sometimes happens, from some unknown circumstances in the fermentation, when such method is not practised, that the wine will turn out cloudy, and not admit of being fined, by any means at present understood: which accident is prevented by this double fermentation remaining, as the second perfectly works all the remaining half fermented parts of the pulp. Moreover, in consequence of this more perfect fermentation, the wine is lighter, and becomes wholesome and perfect with less age: the glutinous matter of the raisins being intirely resolved.

Of this wine, by adding the proper flavour, may be formed, imitations of all the natural wines, of a very strong body: and, by abating the proportion of raisins, sugar, or both, other smaller kinds, may, by the same means, be produced.

If this wine be perfectly fermented, and kept a long time, so that no sweetness remain, it will resemble Madeira: and has very frequently passed for it.

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An imitation of Frontiniac, may be made, by the wine, in which the proportion of sugar, or of malt-spirits, to the raisins, is large; and the whole body weaker. The muscadel flavour of Frontiniac, being exactly to be imitated, by an infusion of the flowers of meadow sweet, in some of the wine: and added in that proportion, which may be found sufficient to raise the due degree of the flavour. In the making this artificial Frontiniac, the fermentation should be stopt, by closing the cask, and adding the spirit, while a considerable sweetness yet remains: and the wine may be drunk after it has been a short time in bottles.

Cyprus wine may be imitated, also, by the same means: the infusion of the meadow-sweet being added to the wine prepared in the best manner above directed. But, in this case, three or four pounds more of sugar, than the quantity given in the recipe, should be used; and the fermentation stopt, while a considerable degree of sweetness remains. This kind will be the better for age: and, if properly managed, can never be distinguished, even by actual comparison, from the true Cyprus: as I can assert from the fact itself.

The imitation of mountain is to be made, by preserving a small degree of sweetness, giving the nut-like flavour, and keeping the best kind of the above wine to a due age. This nut-like flavour may be obtained, by the infusion of the Florentine orris-root, powdered with a very small proportion of orange and lemon-peel: and the wine may be rendered more dry or sweet, by continuing the fermentation a greater or less time; and adding a correspondent proportion of clean malt-spirits, when the fermentation is stopt sooner. The adding some of the stony seeds of the raisins well bruised, also, gives the nut-like flavour: and the putting in a part of the stalks of the raisins, gives a sharpness, found in general in this kind of wine.

The racy taste of canary, now commonly called sack, may be counterfeited by the addition of a proper quantity of the juice of white currant-berries to the wine, made with a large proportion of sugar to the raisins; and left  
very



very sweet in the fermentation. But it is said, that a spirit, distilled from the leaves of clary and clean malt-spirits, and put to the wine, will give to it such a strong resemblance of sack, as renders it absolutely undistinguishable from that wine.

It is said, also, that the juice of the bramble-berries, added to the mixture of the wine, before the fermentation, gives both the exact colour, and flavour of claret. But, in this case, the quantity of raisins should be considerably diminished, and that of the sugar increased, though not to the full proportion: as the fermentation must be continued till all sweetness be destroyed; and this wine is not intended to have so great a body as the others.

It is better, therefore, for this imitation of claret, to work it only of moderate strength; and to add some proportion of distilled spirit: it will be perfect at the end of two years. This, and the imitation of sack by the spirit of clary, I have never seen tried: but have them on very good authority. I should be apt to believe, a small proportion of red-argol, or tartar, dissolved in some of the wine, and added together with the spirit, when the bung is closed up, would assist the imitation very materially.

Any intelligent person may easily collect, from these instructions, sufficient lights to qualify them to make better or cheaper kinds of wine, according to their inclination. But whatever kind is made, at least a year should be given to it: and, in most cases, a longer time. For nothing has so much contributed to the discrediting, and excluding the use of domestic wines, as the drinking them too new: especially after an injudicious, and undue management of the fermentation; by which means they have been made to appear flatulent, acescent, and foul. But the very opposite of these qualities will be found in them, when properly treated and kept.

I shall now proceed to give some directions for making a kind of small beer; which, from cheapness, agreeableness, and perhaps wholesomeness, is greatly preferable, to that which is made by brewing malt: and which has this  
further

further advantage, that it may be made ready for drinking in three or four days time. The reason for troubling you with it, gentlemen, in the *Museum Rusticum*, may not immediately appear to all. Some may deem it a trivial concern; and others may, with truth, say, it is a matter already known to many. As to the first objection, I shall answer, that I believe it may be made very useful to many in particular situations. Where there is occasionally a necessity to employ a number of hands, at particular times; especially in hot seasons, as in the case of harvest, hop gathering, &c. a cheap and very wholesome refreshment may be supplied: and the master, whether farmer, or other person, will find his advantage, in the choice of hands, the incitement of such a refreshment will produce. The same will hold good with respect to several manufactures, where numbers of hands are employed. As to the second objection, that the way of making this kind of beer is already known, the fact must be admitted to be partially true. It is in great use at sea, and with peculiar good consequences, both with relation to its refreshing and salutary effects. For nothing is more preventive of the scurvy, or more agreeably regaling to sailors, than spruce-beer. It is, also, known, and used by the common people on shore, in some particular places. But this is far from being the case in general: as there are many places where no such thing is practised, or understood; though only the smallest wages are there allowed for hard labour; and, consequently, the greatest occasion arises for a substitute to common small beer, which the poor people can neither make, nor purchase. In many of these instances, the means of procuring such a liquor, would be a great relief to them: and to those concerned with numbers of people in such situations, whether colliers, miners, manufacturers, farmers, &c. I recommend, and here give the requisite information for making this beer. The kind, I mean, is that commonly called spruce beer: but the use of the spruce, though good, where it can be easily obtained, is not essential to this liquor. It is, in fact, only the solution of melasses, fermented to a vinous state:



state: and the particular manner of best performing the matter is this.

Take of water, fifteen gallons; and boil one half of it, or as much as can conveniently be managed in such pot, or copper, as is at hand. Put the part of the water thus boiled, while it is yet of its full heat, to the cold part, contained in a barrel or cask: and then add one gallon of melasses, commonly called treacle, stirring them well together. Add a little yeast, if the vessel be new: but, if it have been used for the same purpose before, the yeast is unnecessary. Keep the bung-hole open, till the fermentation appear to be abated; and then close it up. The beer will, in a day or two afterwards, be fit to drink.

It is usual to put tops of the spruce-fir into the water, which is boiled for making this beer: and it is then called *spruce beer*. But though this is done at sea, when such tops can be obtained, on account of the scurvy: yet it is not necessary; and may very well be omitted where they are not to be easily procured. Scurvy-grass, or other herbs or drugs, used in making purl, gill-ale, or any other flavoured malt liquor, may be added at discretion. But a little of the outer rind of an orange-peel, infused in the beer itself, and taken out as soon as it has imparted a sufficient degree of bitterness, will both be found grateful, and assist in keeping the beer from turning sour. A very little gentian root, boiled in the water, either with a little orange-peel, or without, gives also a very cheap, wholesome, and pleasant bitter to this beer; and will likewise help to prevent its turning sour.

I shall now add a few words, on the other subject I have mentioned above; which is, the method of imitating the rum brought from the West-Indian Islands; or rather of making the same elsewhere from melasses. The reason of this consideration is founded, on a well-known fact, *viz.* that from melasses, or the same ingredients as are made use of in the islands where the best rum is made, when they are distilled here, a spirit so different is obtained, that it is not even pretended to be rum at all, but bears the deno-

mination of melasses spirits : and, in the northern colonies of America, also, only a very inferior kind of rum is produced from the same ingredients. Now it is certainly a speculation of some utility, as well as curiosity, to determine to what this difference is owing : and to know, if it can be done, how to produce rum here, instead of the common melasses spirits, from the melasses ; and, in North America, to make such as is equal to that distilled in the islands.

The cause why melasses affords rum in the islands, and a spirit of a different kind here, or of the same kind, but not equally good, in North America, has been ascribed to three principles.

The first is, *that the fermentation renders the spirit different, in this manner, from the effect of the difference of climate.* The second is, *that the melasses being used there while new, are then in a better state for this purpose.* The third is, *that the distilling the rum in large vessels, and suffering part of the melasses and feculencies to adhere to the still, as is practised in the islands, occasions a part of the melasses to be burnt, and consequently to produce a considerable quantity of empyreumatic oil of a peculiar kind, which, rising with the vinous spirit, mixes with it, and gives it the particular flavour and oily nature of rum.*

As to the first reason, or the difference of fermentation in the West-Indies, and here, it might account for some variation in the produce : but certainly not such as is really found in the case of rum and melasses spirit. The great dissimilitude betwixt them lies, in the first, wholly wanting that *acido-dulcid* taste, and oily consistence, that is found in the other ; and which is obviously owing to part of the melasses being burnt ; and affording an empyreumatic oil, that cannot be the product of any mode of fermentation : but must be the effect only of a considerable degree of heat, either during or before the distillation.

The same may be alledged, as to the second assigned reason of this difference, or the newness and freshness of the melasses. For all that would result, from thence, would be, that the new would be less acedent than the older : which  
could



could only make a small variation in the spirit produced, and that of a very different nature from what is really perceived betwixt our melasses spirit and rum. For it is well known, by those who practise imitations of brandy and rum, that acids dulcify the spirit, and render it less fiery, and more gentle: and in the counterfeit rum, a considerable quantity of oil of vitriol is, therefore, used to destroy the taste of *empyreuma*, or faints, as it is called, of the malt spirit, and gives it a softness. So that instead of rendering the spirit more unlike rum, the keeping the melasses, till they tend towards an acid state, would rather promote the resemblance. The peculiar oily consistence, and flavour of rum, can certainly never be the consequence of using the melasses in a fresher or staler state. For, if it had been so, the fact would soon have shewn itself, by the difference of the melasses spirit distilled here; which must, of course, in some cases, have approached nearly to, or actually have been, good rum: as it may be supposed, the melasses must sometimes have been used as newly here, as in the West-India islands: and this would necessarily have led to their being always used so, if such an advantageous consequence had been once known to have attended it.

The last reason, therefore, or the burning of the melasses in the still, if any of the three be, must prove the true one. It was first broached, in part, by Mr. Smith, in a pamphlet, as a supplement to his work on the *Art of Distillery*. He there asserts, as a fact, that it was the general custom for the negroes to omit the perfectly cleansing the stills, which are very large: and that a great quantity of the feculence and melasses adhered, consequently, to the bottom of them, and was continually burnt: and to the empyreumatic oil of the sugar, contained in the melasses, and thus burnt, he attributed the peculiar flavour and oiliness of the rum. Admitting this fact, there can be no doubt, but that the difference of rum, from other spirits distilled from fermented sugar or melasses, must consist in this circumstance: and indeed it is evident, from the very

flavour and oily nature of the rum itself, that the addition of an empyreumatic oil of this kind, really constitutes this difference.

If this be allowed, as there is the greatest reason it should, a method naturally presents itself, of bringing any spirit, distilled, either in Europe or North America, from sugar or melasses, to a very close resemblance, or rather perhaps sameness of nature, with the rum produced in the West-India islands.

This method is the burning a proper quantity of sugar or melasses in the due degree; and adding it to the fermented liquor of melasses before the distillation: by which means it is, on this supposition, presumed, that what is wanting, to render the spirit distilled from such liquor the same with rum, must be of course supplied.

The degree of burning, and the proportion of the burnt matter to be added to the fermented liquor, for this purpose, must depend on experiment: but a few trials would ascertain it. And, if the difference of rum, from melasses spirits, does really reside in this circumstance; which there is great room to think, as well from just observation on the nature of the subject, as from Mr. Smith's authority for the fact; the practice of this method might be rendered of commercial utility. The particular advantages of this would here be, by converting what is now melasses spirit into rum, and greatly increasing its marketable value: and, in North America, by enabling distillers of rum there to bring theirs to a much greater resemblance to that of the islands; and consequently to make a much more advantageous return of the melasses, they purchase by the barter of their own produce: a circumstance, at present, of great consequence, both to the peace and lucrative interest of those colonies.

The rendering rum, by this means, cheaper, would, also, tend to the exclusion of those wretched counterfeit kinds, made of malt spirits, dulcified with a large proportion of acid, particularly oil of vitriol; which are very injurious to particular constitutions. Extreme great quantities of  
such



such counterfeit kinds are now vended: and so much industry has been exercised in the art of making them, that the preparing mixtures, for producing the resemblances of the various genuine spirits, is now become a separate trade: and the professors of it are called *Flavour makers*. All such practices ought either to be under due regulations, or be wholly prohibited: for, being in the hands of persons, ignorant of the salutary or injurious effects of the mixtures they make, ingredients very detrimental may be introduced; and dispensed, by this means, amongst a great number of the common people, who never consult any thing but their palate, in matters of this nature.

I am afraid, gentlemen, I have been more prolix than the room you may chuse to allow to matters of this kind will admit of: in which case, I leave you at liberty to insert this letter, at your own time; or wholly to omit it. But if you are indulgent enough to think it worthy a place, I will endeavour, on future occasions, to furnish you with further matter towards the producing that variety, which some of your correspondents have called for; and which, indeed, you yourselves have lately promised.

I am, GENTLEMEN,

Your very constant reader,

Well-wisher, and humble servant,

COMMERCIALIS.

N U M.

## NUMBER XXVIII.

*Descriptions of those of the Weeds, enumerated in Vol. V. page 301, that are annual, and not universally known. In a second Letter from P. B. C. on that Subject.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

**I**N compliance with a desire, expressed in a note upon my former paper, seconded by *Ruricola Glocestris*, Vol. VI. page 7, I have sent you a short, and, I hope, plain descriptions of the principal *annual weeds*, which I before enumerated. If what I have now done, should prove acceptable, this shall soon be followed by an account of the biennial, and perennial weeds. You will perceive, that I have not described all which were enumerated. The reason is, that some of them, as the Chickweed, Cockle, Poppy, Shepherd's-purse, Sow-thistle, Groundsel, Blue-bottles, &c. are too well known to need a description: others, though it was not amiss to name them, are yet too inconsiderable to attract much notice.

When these descriptions are made, we shall want only the local names \*, and the methods of extirpation, to complete

\* As the local names of weeds, in each country, can be only known by those, who reside there; and must, therefore, be collected by distinct persons, we shall be extremely obliged to any gentleman, who will furnish us with the list of such as come under their respective observation. This may be done by those, to whom, neither the botanical name, nor any other than that common in their neighbourhood, is known. For the plant being easily distinguished by the description, aided by the figure in the plates, there is nothing more required than to join the local name to that prefixed to the description: and thus to make the list. From several such lists, sent from different places, we shall have the proper matter for forming one; which, by a proper digest, will make a catalogue, that will enable every



compleat this subject. If the descriptions be not satisfactory, the names will refer the reader to Mr. *Hudson*, who always quotes *Gerard's Herbal*, where a tolerable \* figure of the plant may usually be found. The division of the weeds into *annual*, and *perennial*, and the addition of the time of flowering, are circumstances, which give some little assistance, at least, in their extirpation.

I am, gentlemen, with the greatest readiness, to contribute towards the improvement of husbandry, through the channel of the *Museum Rusticum*,

Your obedient humble servant,

P. B. C.

every reader to understand what is meant by any name not used in his own neighbourhood. For want of this, obscurity frequently arises in communications from some of our correspondents, who write with great intelligence in other respects.

If any gentleman, who shall favour us with their correspondence, on account of the local names of weeds, will also impart to us any peculiar methods of extirpating them, which may have occurred to their observation, they will very materially contribute to the design of an essay towards an economical history of weeds. E. T. H.

\* In order to render this attempt towards an *economical history of weeds*, more generally useful, and satisfactory, to our readers, many of whom unquestionably have not Gerard's Herbal here referred to: and, in order, also, to show the value we set on our ingenious correspondent's communication, by doing every thing in our power, to make it duly effectual; we have annexed a plate of the figures of the weeds here enumerated; taken either from Gerard's, Parkinson's, or such other Herbals, as supplied them in the most perfect manner: and we will do the same, with regard to the biennial and perennial weeds, whenever he favours us with the promised descriptions of them. In the mean time, we here acknowledge our obligations to him for this favour, in so readily complying with an intimated request, which we did not think ourselves entitled to urge in a more explicit way. R. E. A. T. H.

*Description*

*Description of Annual Weeds, &c.*

**A**NNUAL *Darnel-grass* (see fig. 1. plate 1.) is called *White Darnel* by Gerard \*, and in the Southern counties *Crap*; though, in Worcestershire, they call the Buckwheat by this name †. It was a ridiculous old notion, that this weed, which has ever been stigmatized, as one of the greatest pests of corn, is produced from bad seed of wheat. The French call it *Yuraie*; because, put into bread, or beer, it is supposed to cause drunkenness. It has always been reckoned bad for the eyes; and to occasion vertigoes. This plant is very like the Red Darnel-grass, which has been so much cultivated, under the name of *Ray-grass* ‡, or *vulgarly Rie-grass*: but the spike is much larger and paler; and has beards, which the Ray-grass is entirely without. It is likewise annual: whereas the Ray-grass has an abiding root. Its seeds ripen with the corn.

*Bearded Oat-grass*, or *wild Oats*, (see fig. 2. plate 1.) is very like the common Oat in appearance, but generally over-tops it. The seeds are also of a dusky reddish colour, and hairy towards the bottom. The beards or awns are very long, stiff, and bent. As it ripens with the corn, or but little before it, the extirpation of it is not very easy.

*Bastard Alkanet* (see fig. 3. plate 1.) is called, also, *Bastard Gromill* or *Gromwell*, and *Salfern*. Nothing is more common among the corn, especially among rie, than this weed. It may easily be known, by its red roots; which yield a red tincture, and are used by the country girls in Sweden, to smear their faces with. From the root, usually rises a single stem, about a foot high, rough, and branching out at the top. The flowers are small and white, surrounded with five long, narrow, hairy leaves ||, and succeeded by four white rough seeds.

\* Page 78:

† Ray's English names.

‡ I should suppose, from the French *Yuraie*, it is certainly nothing like Rie.

|| Called by botanists, the empalement or flower-cup.



The *Dodder*, (see fig. 4. plate 1.) is so remarkable a plant, that it cannot be mistaken by those who know the name. It is entirely without leaves: and does not depend on the ground for nourishment; but when it is grown up, rots at the bottom; and lives upon the juices of other plants, about which it entwines itself, by means of small threads of a red colour, which it throws out. The flowers are small, and come out in roundish heads, or bunches, many of them together, here and there, from the stem.

*Small corn Parsley*, (see fig. 5. plate 1.) though it is very common among corn, does not seem to be much known. It is a low branching plant. The branches grow thick together, and are knotted and crooked. The flowers grow close together after the manner of parsley, &c. ; \* and are of a white colour inclining to yellow. The seeds are large in proportion to the plant; and are set about with little crooked bristles; which make them adhere to the stockings in great plenty, when the seeds are ripe; which is about, or a little after harvest.

*The lesser Hemlock*, (see fig. 6. plate 1.) called by Gerard, *Thin-leaved wild Hemlock*, is so well known under the name of *Fools parsley*, as scarce to need a description. However, as it is a matter of consequence to distinguish poisonous plants from those which they resemble, we may observe, that though the leaves resemble parsley, yet they are much darker on their upper surface, but pale and shining underneath. The divisions of the leaves are much sharper; and they have no smell, nor scarcely any taste. When the plant is in flower, it is easily known, by the three long narrow green leaves, which hang down from the little stems, that immediately support the flowers †.

*Shepherd's Needle*, or *Venus's Comb*, (see fig. 7. plate 1.) has its names from the remarkable shape of the seeds with their appendage, resembling in this respect the *Granes bills*: these would be alone sufficient, to distinguish the plant.

\* As all the plants do, which botanists stile umbelliferous.

† The *Involucrum* at the base of the partial umbel.

They succeed small white flowers; and come out in a bunch, like needles, or the teeth of a comb, set close together. The leaves are very finely cut.

*Knot-grass*, (see fig. 8. plate 1.) is so called from its knots or joints, of which its slender creeping branches are full. After harvest, the lands, in many places, seem all coloured with the little red flowers of this plant.—It is called, also, *Swine's grass*: and, in the North, *Bird's Tongue*.

*Black Bindweed* (see fig. 9. plate 1.) has a stem, that lays hold on any neighbouring plants, and twines about them from right to left. Its leaves are smooth, and shaped pretty much like those of the buck-wheat; which its seeds also resemble; being triangular, but smaller. It frequently ramps up in hedges, and gardens; and is also very common among corn.

*Corn-crowfoot* (see fig. 10. plate 1.) has an upright stalk. The leaves are of a pale green; and cut into long, narrow, acute segments. The flowers are much smaller, and paler than in the crowfoots of the pastures: but the seed-vessels are the most remarkable; for they are covered all over with prickles. This is extremely common among corn.

*Charlock*, (see fig. 11. plate 1.) called, also, *Chadlock*, *Catlock*, *Carlock*, and *Wild Rape*, is, I suppose, too generally known to need a description.—The *white* and the *yellow-flowered Charlock*, or *wild Radish*, which are only varieties of each other, and not so common as the former, may easily be distinguished from it, by the paleness of their flowers; and the form of their seed-vessel; which is round, smooth, and jointed. Almost the whole plant is covered with bent pellucid hairs.

*Yellow Vetchling*, or *small yellow Fetch*, (see fig. 12. plate 1.) has long, slender, divided stalks. The leaves are triangular, and grow by pairs close to the stalk. Out of these leaves, comes a tendril, by which the plant supports itself; and, on a long stalk, one small pea flower, of a yellow colour, which is succeeded by a flat pod, about an inch in length; containing six or seven roundish seeds.



*Corn-marigold*, or *Golden Corn-flower*, (see fig. 13. plate 1.) is, the *Buddle* or *yellow Buddle* of the Kentishman \* (Vol. V. 2. and 371.) Its leaves grow close to the stem, in an alternate order. They are of a blue-green colour; and are cut about the edges. The flowers are like those of the *Marigold*; large, and of a beautiful yellow.

*Yellow Rattle* (see fig. 14. plate 1.) is known, by its leaves being finely indented about the edges; its flowers being yellow; and its seed-vessel swelling into a dry, large compressed bladder, divided into two cells, and containing several compressed seeds, surrounded with a membrane.

*Red Eye-bright*, or *Eye-bright Cow-wheat*, (see fig. 15. plate 1.) has a stem rising not more than a foot high; long narrow leaves, indented about the edges; and purple flowers growing in spikes. It flowers in July, and August.

## NUMBER XXIX.

*An Account of a newly-discovered Method of destroying Insects, that devour the Leaves and injure the young Shoots of Fruit Trees, by medicating the Trees with Quicksilver; communicated to the Society for promoting Arts, &c. With Observations on the same, in a Letter from Agricola to the Editors.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

IN further pursuance of my promise, of communicating to you observations on any matters of importance, which should come under consideration in the *Society for promoting arts, &c.*; and, in order to aid their intention of having as many experiments as possible made on this sub-

\* His *Blue Buddle* is I suppose *Blue Bottles*, so common among corn.—What the *Walder* is, I cannot imagine. He explains it, by its being like *Kilk*, which is to me *ignotum per ignotius*

ject; I here send you an account of a supposed *discovery*, respecting the means of *destroying insects on trees*, communicated to them: and which, if, on further trials, it prove true, must of course be deemed as curious as to the manner, as important as to the consequences. Curious as to the manner, because it cannot be accounted for by any of the laws and properties ascribed to vegetables, by those, who have proceeded on the ground of induction, the only safe foundation on which we can form principles in physics: and important as to the consequences, because it would not only afford an easy and effectual remedy for the great mischief done, by insects and caterpillars, to the product of fruit; for which end it is now proposed: but because it will also necessarily lead to many applications of the same means, to other intentions, not less beneficial: and, moreover, give a light into the vegetable œconomy, that can scarcely fail of producing the most momentous effects.

The facts contained in this account, may appear to persons, not acquainted with chemistry, and the physiology of vegetables, very probable: as being of a simple nature; and not attended with any difficulty to the conception: but to the more intelligent in those branches of science, they must seem very extraordinary; when the nature of the subject and manner of operation are well considered. And, indeed, if the account itself did not come vouched by a very respectable authority, a considerable share of credibility, would be requisite for any degree of belief in it. Not to dwell too long, however, on the disquisition of a matter, the particulars of which, are not yet displayed, I will now proceed to state, what was laid before the Society; and the manner in which it was done.

The narrative of this discovery, was contained in a letter, written by Dr. R—— to Dr. P——, and dated March 11, 1765; in which the former begs the assistance of the latter, “ in laying, before the learned world, an account  
“ of some experiments, that have been tried with success:  
“ and which, when fully known, will, he believes, be of  
“ very



“ very great service to the vegetable part of the creation,  
“ by totally destroying those pernicious insects, that are  
“ apt to infect the tender leaves and young shoots of our  
“ choice fruit-trees: and for which, no remedy, that he  
“ had ever heard, or read of, has been as yet proposed,  
“ that is either adequate to the disease, or effectual to the  
“ cure.” Dr. R——, therefore, in the following part of  
the letter, desires Dr. P—— “ to lay, before the Society  
“ for the encouragement of arts, &c. the following expe-  
“ riment, that was tried last spring, with success, by one  
“ George Bradford, a clothier in the city of Hereford,  
“ and a very ingenious young man: in order, after the  
“ experiment has been fully tried, they may reward him  
“ in proportion as he may seem intitled to it.” But Dr.  
R—— adds, that “whether he may be thought worthy of  
“ any recompence, or not, he very cheerfully submits it  
“ to the trial of the curious; and hopes, they may reap  
“ the same advantages, he did last year, by clearing their  
“ trees of these pernicious insects.” The Doctor then  
proceeds as follows, to give the relation of Mr. Bradford’s  
invention and success. “ The first tree he tried the expe-  
“ riment upon, was a favourite plum-tree: I think, a  
“ green gage. He was afraid of trying it on the whole  
“ body of the tree at first: as he did not know, but that  
“ it might kill it at once: and therefore he selected out a  
“ particular branch, that was designed to be cut quite  
“ away, at the winter pruning, for the subject of his first  
“ essay. The method of the experiment is this: He took  
“ a small awl; and pierced, sloping, through the rind,  
“ and into part of the wood of the branch, but not to the  
“ heart or pith of it; and poured in a small drop or two  
“ of quicksilver; and stoppt it up with a small wooden plug  
“ made to fit the orifice: and the result of this experiment  
“ was, that the insects all dropt off, from that very branch,  
“ the next day; and, in a day or two more, from off the  
“ other branches of the tree, without any other puncture:  
“ and the tree continued in full vigour; and throve well  
“ all the summer after. Encouraged by this success of  
“ the

“ the first essay, he next tried it upon a honey-suckle; the  
 “ leaves of which were quite covered with them: and  
 “ here he scraped away the top of the ground with a  
 “ trowel; and run his awl, in the same sloping manner,  
 “ into the main stem just above the roots; but, with the  
 “ same caution as above, not quite to the inner pith; and  
 “ the success was the same as before. The insects all  
 “ dropt off dead the next day after the experiment was  
 “ made. The above facts you may safely depend upon:  
 “ and I saw both the trees, on which the experiments  
 “ were made, since Christmas last; and they then seemed  
 “ to be both very healthy and well. I did not, indeed,  
 “ see the operation performed: as I was at that time on  
 “ my residence at L——: but the method, manner, and  
 “ success, as above related, I had from Mr. Bradford’s own  
 “ mouth.”

This is the account of Mr. Bradford’s experiments, as  
 related by Dr. R——, which I thought it most fair and  
 proper to give in the Doctor’s own words, as in his letter,  
 that your readers may have the matter in the most simple  
 and satisfactory view before them: and, I conceive, that  
 in thus communicating it to you, I am greatly promoting  
 the intention of the Society, as well as that of the Doctor;  
 who says, “ I think the more universally this remedy is  
 “ known, and the more it is tried, the greater service it  
 “ may prove to be to the skilful in botany: and vegeta-  
 “ tion, thereby, be greatly improved.”

This letter from Dr. R——, as mentioned above, was  
 dated March 11, 1765, though the delivery of it to the  
 Society, was deferred from accident till February last.  
 But Dr. P——, in his letter to the president, desiring him  
 to lay the other before the Society, remarks, that experi-  
 ments have been since made, which confirms the first ob-  
 servations. He says, “ the advantage, however, hath  
 “ arisen from this delay, that Dr. R—— hath had fuller  
 “ proof of the success of this discovery.” The particu-  
 lars of these further trials, in the year 1765, are not rela-  
 ted: but we may, from the silence in this point, conclude  
 them



them to be the same as in the preceding year: otherwise Dr. R—— would certainly have given the detail of them.

In this manner was the affair communicated to the Society, through the hands of Dr. R—— and Dr. P——: and it is not less extraordinary, as I above intimated, with regard to its probability, than its consequences. The veracity of these gentlemen must be, nevertheless, unquestioned: and if we entertain any doubt of the facts, we can ascribe the error of the account to nothing, but some mistake in the observations on the experiments: an event, that has happened, from a singular coincidence of circumstance, attending particular trials of such matters, to very judicious and accurate inquirers in many similar cases. It may not be improper, however, to state and explain, more particularly, where the difficulty lies, with respect to the readily adopting the notion, that this manner of medicating trees, may be attended with the consequences here related: as such an inquiry may not only excite a due caution in the observations, that shall be made in future experiments on this matter; but furnish some lights, which may lead to a more effectual and decisive performance of them, as well as to the varying them, with design to gain further important lights on this very curious subject.

In order, therefore, to investigate the matter in this view, it will be proper to examine, how far the appearances, here said to have presented themselves, correspond with known principles relative to the effects of quicksilver; and to the vegetable œconomy, as far as hitherto understood. In such a disquisition, we shall immediately find two very essential circumstances in favour of this relation. The one is, *that quicksilver, dissolved in any vehicle or menstruum, capable of diffusing it properly, destroys, when brought in contact with them, almost every kind of small animals, whether insects, or of the vermicular tribe: and this, though the quantity of such quicksilver in the vehicle be extremely small.* The other is, *that quicksilver, in some conditions, may be absorbed by plants; and pass with their sap or juices to the extremities of the branches, stalks, and leaves,*

*leaves, without the least injury to their health or vigour:* which holds good even of some of the most tender and succulent kinds.

The poisonous property of quicksilver, with respect to most kinds of small animals, is too generally known, to require the least attempt to its proof: and that the most minute quantity, when dissolved in any fluid, capable of diffusing it, may be sufficient to this effect, is evinced in the case of a preparation used by farriers, called the mercurial water. It is made by boiling quicksilver in water: and though it contains so little of the quicksilver, that there is no sensible diminution of the weight of the quantity put in to be boiled, when the water is afterwards poured off; yet it is well known to destroy worms of a very considerable magnitude, in the intestines of horses, to which it is given; and affords, therefore, a very clear evidence, as well of the destructive qualities of quicksilver, to vermicular animals, as of the very small quantity that is sufficient to such effect.

That plants are capable of receiving quicksilver, under some circumstances, into their sap-vessels, and conveying it throughout every part of their stems, and leaves, is demonstrated by the very extraordinary fact, related in the letter from Governor Thicknesse to you, inserted, Vol. I. No. 67, page 278. In this most remarkable instance, it appeared, that, notwithstanding the plant was so replete with quicksilver absorbed from the ground, where some preparation of mercury had been accidentally thrown, as to perspire it in a surprizing quantity, the plant yet flourished as much, as the others of the same kind growing near it. As this fact is attested, not only by the gentlemen, to whom Governor Thicknesse referred, but by several others of my acquaintance, who saw the plant in this state, the truth of it cannot reasonably be doubted: and consequently it affords a full proof, that quicksilver, in some states, may be taken up, and combined with the sap of plants, so as to be diffused through every part.



There is, nevertheless, another fact related, respecting the finding quicksilver in plants; which, though it does stand on so good an authority as the preceding, yet demands some attention. What I mean, is, an account, to be found in Abbé Lambert's *curious observations, on the manners, natural history, commerce, arts, &c. of the nations of Asia, Africa, and America*, of the production of quicksilver by vegetables in China. The passage, in his work, is this. "There is a method, says the Chinese author; of drawing mercury from wild purslane. For this purpose, you need only take the little leaves of purslane; bruise them in a mortar with a pestle of the wood of Egyptian thorn: and then expose them to the rising sun, for about three days; and when they are dry, roast them, so as not to destroy their nature and virtues. Put this mass in a well-varnished earthen vessel, which you must close well, and bury it in the earth forty-nine days: after which, take out the vessel; and you will find quicksilver in perfection.

"Nothing is more certain than this secret, and, in the shops in Pekin, they sell two sorts of mercury: the one taken from the mines; which is called *Chan-choueir*; and the other, obtained from plants: which is called *Tsao-chonièn*."

The process for procuring the quicksilver here given, favours much of the mystery of alchemy, or may perhaps be related with an omission, or other mistake, of the sense of the Chinese writer from whom it is taken. The addition of some fluid to the roasted leaves, seems absolutely necessary, in order that any change should be effected; as we know no ferments, or quick revolutions of nature, are produced in bodies while they are in a dry form. But if quicksilver were contained in a plant, in a very divided state, the burying the plant with some proper fluid, in order to its putrefaction, might be a proper means of recovering such quicksilver. The fact, however, of there being a kind of quicksilver, commonly sold in Pekin, of which the very name, in distinction to another kind, de-

clares it to be of vegetable production, merits greatly our notice.

If it be true, that quicksilver is thus obtained in China, from plants, they must take it up from the ground, abounding with some mercurial mineral; most probably of the cinnabarine kind: on which supposition, the fact would agree intirely with that of the above-mentioned instance, and receive credibility from it. For, in that case, there is great reason, according to the gentleman's account, on whose garden the accident happened, to believe the preparation, thrown on the earth, that mercurialized the plant, was some combination of quicksilver and sulphur: which is, in reality, cinnabar. Had it not been for that accidental instance of the thing itself, I should have looked on this passage, in the Abbé Lambert's book, as scarcely worthy observation, from its high improbability, and want of great historical authenticity: but this concurrent circumstance, makes the truth of that relation deserve further inquiry.

With respect to the two leading principles, *that quicksilver, dissolved in a proper menstruum, and diffused in the most minute quantity, will kill worms and insects; and that it is capable, in some circumstances, of being received into the sap-vessels of plants, and passing to every part, without injury to them*; Mr. Bradford's experiment is, in a general view, extremely consistent with known facts. But when we come to consider the manner of the operation, other principles come in question, that evidently suggest the greatest difficulty of assent.

In the first place, quicksilver, in a crude state, does not combine with the sap and juices of plants in common: nor indeed with any that experiment has hitherto informed us of: and yet we see it was not one species of trees or shrubs only; but different kinds, that alike combined with it here, so as to convey it with celerity to the remotest part of the plant: and this was performed without heat, or any of those means, that promote the action of bodies reluctant to combine with each other.

In



In the next place, the surface of the quicksilver, in contact with the sap, is exceeding small in this experiment : being only the extremities of the divided vessels of the wounded part of the plant : and from them it is more natural to expect an emission of the sap, than an absorption of any fluid ; much less of quicksilver in its crude and undivided state ; in which the particles have a very strong attraction to each other, as is evident from the most simple trials, with respect to the confluence of small globules of it, when they approach each other. So that it puzzles the imagination greatly to conceive, by what mode of operation, the quicksilver is forced or drawn into the sap-vessels of the plant, while in this state.

In the last place, admitting the sap would combine readily with the quicksilver, and the vessels would absorb the compound, how can it be supposed, to be conveyed to the remotest part of a plant in so short a time, as it appears to be, by the facts here related ? It will be immediately answered by some, in consequence of the circulation of the sap. But that the sap does circulate at all, is a mere hypothesis : and an hypothesis indeed, exploded by the most judicious examiners into the vegetable œconomy, though remaintained by some flighty modern French writers. It is, therefore, only establishing one difficulty on the shoulders of another, and not really removing any obstacle to a belief of the fact, to ascribe this sudden conveyance of the quicksilver to a circulation of the sap. The ascent and descent of the sap, to and from the root to the extremities, is agreeable to experiment, and known physiological principles : but a circulation, like that of the blood in animals, such as could be supposed to carry and diffuse the medicated juice of the part of the plant, where the quicksilver was applied, to every other part, in two or three days, as is here said to be the case, is neither consistent with the result of other experiments, nor accountable from any thing in the organization, or mechanic structure of vegetables. For they have no heart, or analogous muscular apparatus, to propel their sap ; no elastic arteries to

aid its motion, by their resiliency, nor such sensation or irritability, as can urge their vascular parts to continual action by repletion, as in the case of animals, nothing that can account for a circulation of sap similar to that of blood.

Moreover, the difficulty, in receiving the notion, that impregnated juices can be conveyed from one part of a plant to the whole so rapidly, does not lie in theory only. If we observe what happens in other cases, we shall, respecting facts, argue strongly against it. One striking instance is, the manner of communicating the variegation of the jasmine shrub; where the contamination requires a very considerable length of time to be spread over the whole plant. To render this inference, from the variegation of the jasmine, intelligible, requires some explanation to those who are not versed in the history of vegetation. The variegation of the colour of the leaves, or branches of plants, are owing to contaminations of their juices; which happen from accident, or may be effected by art in various manners. In this, of the jasmine, it is performed by inoculating any branch of a tree of the natural colour, with a bud taken from a variegated one; and afterwards pulling off the bud in a few days. By this operation, the juices of the part of the branch, where the bud was inserted, are infected by those of the bud: and, after some time, the superior part of the branch begins to be blotched, as well the green wood as the leaves, with a strong yellow colour: and this, the year after, appears in other parts of the tree; and, by degrees, spreads itself over the whole. Here we see the progress of the impregnated juice, to the distant parts, slow and gradual, agreeably to the effects of the ascent and descent of the sap; and consequently very dissimilar to that in Mr. Bradford's experiments, which could not be produced by such ascent or descent. If on repetition, therefore, his observations should be verified, it must, consequentially, be admitted, that there is a circulation of the sap; and, indeed, a very quick one: which would be a most curious circumstance attending



attending this discovery. But, in the mean time, in proportion as the organization, and other circumstances in the known œconomy of plants, seem oppugnant to such a circulation, a greater degree of experimental proof, seems wanting to establish the certainty of the facts, as presumed according to his account.

I hope, however, it will not be understood, that I have stated these difficulties, in order to dissuade any from making further experiments on this subject, or much less, to impeach Mr. Bradford's veracity. It is, on the contrary, to shew how curious and interesting this matter is, as well with regard to speculations of the highest moment, as to the immediate practical consequences; to inspire the greatest caution and attention, as well in the operation, as the observations on the result, and conclusions drawn from it; and to give some lights respecting the consequences of further experiments, that may occasion their being varied and extended, in such a manner as may be most effectual in producing the future discoveries, which may be expected from establishing the principle, that trees may be medicated, so as to make quick changes in them, by such a method of application. This is my real intention. For the improbability, arising from facts, not squaring with received theories or general analogical appearances, is by no means, in my opinion, a sufficient reason against examining strictly into them, when they are vouched on good authority: and delivered with so great an air of candour. I cannot, for my own part, conceive a stronger argument in support of this, than may be drawn from the instance of the plant perspiring quicksilver, as before mentioned; of the truth of which I can have no doubt at present; but must own it was, in itself, as incredible on all accounts, as Mr. Bradford's relation of the event of his experiments. Instead, therefore, of discouraging the further pursuit of this matter, I would urge the most earnest recommendation, that every trial respecting it may be made by those who have proper opportunities: but that such trials should be made with the utmost caution. In  
order

order to which, it would be certainly right to chuse trees, which are in the neighbourhood of others equally infested with the grubs or insects; and to observe closely, from time to time, the difference betwixt those on which the operation is performed, and those that are left in their natural state, if any shall result from the operation.

It would be well, also, not only to make the experiment on a variety of trees, but even on the stronger herbaceous plants: for though such a practice might not answer the trouble, in order to save a crop of collyflowers or cabbages; yet, it might avail in more important articles, as particularly sugar-canes, to which, immense damage is sometimes done by the devastation of small animals. If such trials be made on herbaceous plants, they should be on parts of the stalks that are hard, and tend to a ligneous texture; or, in default of such, on the uppermost part of the root.

If quicksilver be found to act on plants, by this method of application, other bodies miscible with the sap, may, likewise, by the same means, be made to have their proper specific action. This opens a field of inquiry for the effecting some other great purposes, by this method. I will hint one, that will be very obvious to those, who are acquainted with the modern doctrines, of the physiology of plants, though it may not be intelligible to others. We are ignorant what, in the natural and healthful state of a tree, determines a bud to form a ramifactive, instead of a fructiferous shoot, of either of which, experiment shows it is originally capable. Linnæus says, "The person  
" will give a great addition to the science of vegetable  
" physiology, who shall say what it is, that influences the  
" extremities of the plant, to break out into flowers and  
" form seeds." But this ignorance extends only to the natural and healthful state of plants: for we know, that art can produce it by lopping, and contamination. It is an odd paradox: but the means by which we give fertility to vegetables, is by weakening the plant, through the effects of the knife, or poison. Would not, therefore, this  
method



method of medicating trees, if found to be really as now presumed, be a much more certain, and facile way of imparting the proper contamination to them, than any hitherto known? It is, indeed, pregnant with many important consequences; and ought to be well attended to: and, indeed, we have no reason to fear, but that the observations, which will be communicated to the Society, and to you, will furnish us with sufficient *data*, to form conclusive notions.

The importance, and curious nature of this subject, has led me into a longer discussion of it, than I at first intended: and, I shall, therefore, close my letter with an intimation, of what I think a material, though slight alteration, in the performance of Mr. Bradford's experiment.

He mentions the use of a *small wooden plug, for stopping up the hole, into which the quicksilver is poured*. In the case of young and tender trees, there is a danger of splitting part of the wood, by the forcing in such a plug: which would, if the operation were performed on the main body of the tree, be very injurious to it; and defeat the experiment. Instead, therefore, of the wooden plug, I would recommend the use of a compound, of one part of turpentine or tar, with two parts of bees-wax, melted together; which, being worked with the fingers at the time of using, will become soft; and being thrust into the hole, will grow hard again here; and secure the mercury, much better than the plug, which is liable to be driven out by many accidents. If, nevertheless, it should in any case be proposed to open the hole, to see whether the mercury be wholly, or in any visible proportion absorbed by the vessels of the plant: I would advise the use of bees-wax alone, worked by the fingers into the form of a plug, and used as such, leaving a small part out of the hole, compressed into the shape of a flattish bottom. For this may be taken out, or put in again at pleasure. The avoiding the use of a plug, is particularly, and indeed, very essentially necessary, if the experiment be made on tender shrubs, or herbaceous plants: as they might, otherwise, be split or wounded in a manner fatal to them.

I hope,

I hope, gentlemen, as the season approaches for making these experiments, this will find a place in your next publication, which will encourage me to furnish you with similar discussions, on such subjects as future occasions may offer; and in the mean time, I shall soon again trouble you on the important head, *of the production of silk in England.*

I am, GENTLEMEN,  
 London, Your very humble servant,  
 March 16, 1766. AGRICOLA.

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## NUMBER XXX.

*Further Considerations on the Effects of the Bounty on the Exportation of Corn; being an Answer to some Particulars in E. S.'s Letter in Number 28. Vol. VI.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

WHAT your correspondent has advanced, in No. 28. for January, page 16, that it is on all hands agreed, the granting a bounty upon corn exported, has encouraged agriculture, is not consistent with some other parts of his letter, where he says it has rendered it cheaper upon an average. It may be averred for a truth, that our exports tend to enhance the price, at intervals, above the ability of the labouring people to pay and maintain their families: and, hence, as the number of people are diminished, the farmer loses his market at home. In the year 1739, or 1740, wheat sold for ten shillings *per* bushel. This, with the stagnation of trade in consequence of it, made our church-yards resemble a new-sown field: and the farmer fails thus of his best support. One parish in the West was said to pay for fifteen hundred coffins in fifteen months time. In the year 1742, or 1743, wheat sold for two shillings and six-pence *per* bushel. Hence appears the absurdity



dity of an immoderate price: for, in this manner, it will ever tend to sink itself, and avarice be justly rewarded.

The average price, at different periods of time since 1594, is of no importance. If we had been informed of the years of dearth, and thrown those out of the account, as unnatural, we might have drawn the average price from the remainder, consistent with the ability of the people. By which, perhaps, the price in the whole period of time might not amount to more than three-and-sixpence *per* bushel for wheat.

If the exports, for ten years, amount to no more than one million two hundred thousand pounds, about one hundred and twenty thousand pounds, one year with another, is it not highly unreasonable, the price should be raised at home by it, to the amount of five millions *per annum*; and thereby make thousands wretched: to which we may add, the ruin of the trade of the nation! This is a tax without a name, whereby more has been raised, than we pay in consequence of our great debt.

What is said, that wheat alone has been sinking for a hundred years past, when all other things have advanced, is not true. For what species, or kind of manufactures, have we, that are not greatly improved, and rendered much cheaper, though the rents of lands were never higher than at present; and, have been raised, perhaps, in many parts of the kingdom, within the last century, a hundred *per cent*.

That the returns made us for corn exported, compensate for the short harm to particulars, can be advanced only by those, who have no feeling for the wretched. How much more eligible would it not be, in a dull time of trade, to pay a bounty, on our manufactures, for those foreign markets, where we are under-sold, and thereby enable our people to pay for, and consume our corn at home? This would produce a neat profit to the state, enable multitudes to maintain themselves, and pay to the land two-thirds of all their industry.

How can agriculture be the mine of our wealth, &c. ? Is it not the labour of the multitude, that supports those who deem themselves above work ; and thereby enable all, from the merchant to the workman, to pay the great fund to land, which may be deemed its present value ? Hence, its people being well employed is our mine. Hence, agriculture is raised by commerce, and will sink with it : and, likewise, hence, the shuttle and flail, furnish our tables with delicacies, fertilize our lands, reward the husbandman, guide the plough, and furnish every blessing that animates, and make all rejoice, and be thankful.

The harmonizing agriculture with commerce, may be, perhaps, the most important consideration of the state : but my time will not permit me to say more upon it at present.

I am, Sir, your's, &c.

A MANUFACTURER.

## NUMBER XXXI.

*A Letter from Mechanicus, relating to Mago's Instructions for the Management of his Farm ; with some Observations on the Nature of Marl.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

**W**ILL you, the Editors of the *Museum Rusticum*, condescend to indulge me, the first opportunity, with room to acknowledge a debt of gratitude, so justly due from me to *Mago* ; for his very kind and much-wished-for advice, that he hath so generously given me through your obliging channel ? A man of a grateful disposition could not, without doing violence to his very nature, restrain his pen from offering a tribute of duty, and thanks, on so



particular an occasion : the great disproportion of circumstances, possibly enhances the obligation. When gentlemen of independent and affluent fortunes are so easy of access, as to regard those who move in the lowest sphere of life, is such a character, that few, very few, I am afraid, will choose to imitate. Let me here declare, that I would not be thought guilty of the least degree of adulation, which to a sensible man must appear in the odious light of satire and reproach, and a palpable affront to his very judgment. In such a point of light, I hope I shall not stand, in having thus spoken the genuine sentiments of a heart warm with gratitude.

I am perfectly convinced of the justness of *Mago's* advice ; and intend, as far as I am able, punctually to adopt the whole of what I am directed, in his letter inserted in your last *Museum*, as soon as I have a convenient opportunity. Sometime before I received his kind letter, I had opened some gutters in the same piece of land, mentioned in my queries ; which have already had a very considerable effect, by draining off the superfluous moisture. I can perceive it to be less poachy than ever I remember it to have been before at this season. Happily, there is, in the same piece, a considerable quantity of stones, that are now an incumbrance : but which may, upon *Mago's* scheme of making drains with them, be converted into a real and permanent advantage. I cannot help believing, that Philomath (to whom I am very much obliged) is not much acquainted with marl ; as I clearly expressed in my queries, that the land was light and spongy, and consequently wants solidity to support any useful crop to advantage. I had conceived, that marl would give it such a body ; and, with that view, I was more particular in my account of it. I wish I had been more explicit in my queries, I had not then led *Mago* into an error, by supposing all my land was of the wet and poachy kind, for I have twelve or fourteen acres of as fine a soil, rather inclined to gravelly, as most is, the management of which, I was at no loss about, as I concluded its

natural manure must be marl \*, of which we have plenty. I only meant, that this part, through neglect, was covered with docks and thistles ; but as to the wet and poachy piece, I was utterly at a loss how to manage with any prospect of success. I, also, mentioned, or at least, intended to do so, that I had some other material petitions relative to some meadow-land, whose situation has several peculiarities ; and I cannot but believe, it would be of great use to the public, to know the proper management necessary to improve such kinds of meadow-land. Gentlemen, if it were my intention only to follow the common methods of husbandry, surely I had been unpardonable, to have given you any trouble, by requesting you, or your correspondents, to have instructed me, with what I might have had from my neighbours. No, gentlemen, my desire and intention is, to practise every new and rational improvement, that I can discover to have the appearance of reason to recommend it.

I hope, gentlemen, it will not be thought inconsistent with the utility of your plan, to advance, by way of hypothesis, what occurs to me on the nature and properties of *marl*, which I take to be of a *scapy*, or *unctuous* texture, easily disuniting into very minute particles, consequently well adapted to insinuate itself into the interstices of the more or less compact varieties of *soil*. If this be allowed, it will have a double effect, first, in opening or disuniting the more solid kinds of *earth*, by the supposed minuteness, lubricity, and great divisibility of its particles ; and thence preventing, by its intervention, the cohesive nature of the compact, homogenous earthy *bodies*. Secondly, in filling up the chasms, or the too great vacuities in the lighter kinds of *earth* : which are the faults to be remedied in this kind of land, which want more solidity. Surely nothing in nature can be better adapted than *marl*, to give it such

\* I took the advantage of the frost this winter, and marled three acres of this land upon the turf ; I propose to plough it next spring, and sow it with pease. If that crop proves good, I imagine it will afterwards do for wheat. *Mechan.*



a body ; and it also prevents, or retards the rain from too quick a descent, by its *unctuous quality*. I beg leave to oppose these humble hints, to the doctrine of *fermentation*, which I think *marl* cannot be possessed of in a degree equivalent to its well-known lasting and prolific power. If *fermentation* be the only cause (as I have somewhere seen asserted) of that allowed prolific power, inherent to *marl*, the effect must then cease, when *fermentation* is at an end : which, if any at all, must, I conceive, be but of a short duration. The prolific power of *marl*, mixt with a proper *soil*, is of a much longer continuance than can be reasonably allowed to *fermentation*. Therefore, I would beg leave, to conclude, that the prolific effect of *marl* \*, is caused

\* We are willing to give a place in the *Museum Rusticum*, to any ingenious opinion of your correspondents : but in so doing, we hope it will not be in the least understood, that we make ourselves answerable for them, as giving any other kind of sanction.

The knowledge of the principles of vegetation is, at present, very much confined. We neither demonstrably understand what is the real *pabulum* of plants, nor the particular manner in which the various kinds of bodies, not themselves the *pabulum*, are, nevertheless, necessary, or conducive to prepare it for, or convey it to them. Both which are very requisite to be comprehended, before we can, with any just hopes of success, attempt to form theories, to account for particular effects of bodies in fertilizing plants. In order to make any certain advance towards discoveries, relating to the peculiar modes, by which mysterious effects in vegetation, are produced, it is necessary to be very accurately and minutely acquainted with natural history, and chemistry. For how can we pretend to form notions of the particular manner of action of those bodies on each other, of whose distinct and respective qualities and properties we are ignorant ? It is with regret, therefore, that we see those, who are not well acquainted with the previous principles to such inquiries, frequently undertake them ; and jumping to conclusion, over all the necessary premises. Hence we see some mechanical reason advanced to explain, in a simple way, what depends, perhaps, on the most complicate co-operation of the chemical qualities of bodies, that have no concern with their gravity, texture, figure, or any of their general properties : or we see some crude notion of *fermentation*, solution, &c. grossly applied, where it has none, or perhaps a very partial relation to the subject in question. It is one thing to form practical theories from observations on the  
immediate

caused by the soil assuming a different texture, better suited to the nature and *economy* of *vegetation*. And what further convinces me of the truth, of what I have above advanced, is, that the effects of *marl* are not discovered in any great degree, until the *marl* is thoroughly mixt or incorporated with the soil: which, I think, is an obvious proof of what I have said on its properties. I could inlarge a great deal on this head, but would rather choose to suspend any further remarks, lest I may give umbrage to abler pens, who have espoused the principles of *fermentation*, as absolutely necessary to *vegetation*. I would here beg leave to premise, that I only intend this as a sketch, and much wish to see the subject, handled, more at large, by more masterly pens, and penetrating heads. I could wish to lead *Mago* into the discussion of this article, I should then have the satisfaction, to see some masterly strokes displayed on a subject of no small importance, to the improvements in agriculture, by this almost universal, and natural manure.—Perhaps, it may be said, by some, that are more critical, than good natured, who made you a teacher? Is this Mechanicus? You, who but a few months past, was the humble petitioner. Does the haughty *Plebeian*, presume to commence instructor, and dogmatically insult his superiors? To which I answer, No, all, I aim at, is a candid disquisition, and an useful research after truth, not only in this, but in every point, both of practical and speculative knowledge. By

immediate consequences of things, presented by natural accidents, or artificially produced: and another to dive into the secret philosophic principles of the causes. The first is in the reach of every sensible person, intelligent in general matters: the other requires very extraordinary acquired qualifications, as well as great natural sagacity and penetration. It is, therefore, to be wished, that the first, which is of more immediate good consequence to the cause of agriculture, should be the object of attention to all who have opportunities to cultivate it: and that the other should be left to persons, whose situation and qualifications, enable them to pursue the abstract study and nice courses of experiments, necessary to the forming *systems* of principles: for, in these matters, nothing can be either well understood, or communicated in a detached manner. R.

comparing



comparing opposite things, and qualities, sometimes the truth is discovered, which before had lain dormant, by implicitly receiving, what had been affirmed by those, whose figure and authority, had given, some particular tenet, the current stamp of truth. Nothing can be a stronger illustration of this point, than the universal establishment of the Ptolemaic System. The inference, I would draw from this, is, that so many ages, of such elaborate, and studied mistakes, should inculcate this useful lesson, to make us humble in our opinions, in such pursuits, wherein the human faculties can have no certain ideas to direct their knowledge beyond what nature designed us.—I have wrote (I am afraid) a long letter upon a subject, that both the editors, and correspondents of the *Museum Rusticum*, will say is little to the purpose.—I can say but little to the contrary, and to say any thing, by way of excuse, will only add more to much less purpose. I will, therefore, only make this further observation, that I heartily join with *Mago*, whose letters are an ornament to the *Museum Rusticum*, that Mr. Scott owes him, and the *Editors*, very particular acknowledgements. Mechanicus, who lies under no less an obligation, will in due time remember to give a faithful account of his success: and, in the mean time, I am, most sincerely, *Mago's*, and the *Editors*,

Near Stafford,  
March 16, 1766.

Obliged humble servant,  
MECHANICUS.

P. S. Gentlemen, if you think the following account any curiosity, deserving a place in your repository, I should be glad to see it published. On Monday last, was killed, at John Stubs's, gentleman, of Ranton Abbey, near Stafford, a bull, whose age and time of feeding I have no account of; the weight of this extraordinary creature was given me, by the above gentleman, at my request, the veracity of which may be relied upon. I cannot but believe, this curiosity will be acceptable  
both

both to the editors, and purchasers of the *Museum Rusticum*.

The particulars of his weight.

|                  |           |     |
|------------------|-----------|-----|
| The head         | - - - - - | 56  |
| Blood            | - - - - - | 59  |
| Intestines       | - - - - - | 339 |
| Feet             | - - - - - | 36  |
| Hide             | - - - - - | 172 |
| Tallow           | - - - - - | 147 |
| One fore-quarter | - - - - - | 468 |
| Other ditto      | - - - - - | 460 |
| One hind ditto   | - - - - - | 346 |
| Other ditto      | - - - - - | 331 |

Total weight 2414 pounds.

N U M B E R XXXII.

*Some Observations on the Premiums offered by the Society, for a Machine for slicing Turneps; on the Nature, Culture, and Uses, of Turnep Cabbage, and on the Advantages of the Drill-culture. In a Letter from Mr. Wynne Baker to the Editors.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

I HAVE just received No. 27 and 28 of your work, in which I find two letters from your correspondent Agricola, who appears to be a member of the Society for promoting arts.

I cannot but feel great happiness, that my labours coincide so much with the views of that Society, as to induce them to offer premiums for promoting any thing, which I have recommended to the attention of the farmer, to whom, I really wish to be serviceable.

I shall



I shall just beg leave, to return my thanks to Agricola, for his candour and politeness towards me, in his treatment of the two subjects, (in his letters, one in No. 68. Vol. V. and the other in No. 9. Vol. VI.) which have arisen, from my report to the Dublin Society for the year 1764. Writing is not a business, that I am by any means fond of: but, where I think it my duty, I shall always sacrifice my more interesting entertainments of the field, (do not apprehend them to be either hunting or shooting) to the employment of my pen.

First, the letter, No. 68. p. 316. Vol. V. from Agricola, seems to require some observations to be made by me, as I appear to have been the *cause*, though *not the author* of that subject.

I honour the Society for their laudable design, in attempting to obtain an instrument for the cheap and expeditious slicing of turneps: but I must beg leave to observe, that to slice them for sheep is quite unnecessary. Agricola says, p. 387. "they make great waste \* of them (turneps) " by scooping out the middle, and leaving great part with " the rind and skin." This will always happen, when the sheep are pastured upon the turneps in the field where they grow; but if they are drawn, and laid upon pasture or meadow land, there will be very little waste; for in a manner, the sheep will eat them clean up, shells and all: of which excellent practice, and the profitable consequences, you will very shortly have an opportunity of communicating some account to your readers, from my report to the Dublin Society, for the year 1765. But, as to its being urged, that the accident of choaking horned cattle, does not so often happen as to counterbalance the ex-

\* Agricola here only gave the reasons, urged to the Society for the establishment of the premium for the slicing machine; which were not founded solely on the facts in Mr. Baker's report; but, on the information also of a number of gentlemen during the debates on this matter: and among them, several did strongly insist on the expedience of slicing the turneps for sheep under certain circumstances. E. O.

pence, of slicing the turneps, I must join with Agricola ; and do again repeat it, that slicing the turneps for them is *necessary* : in order to convince my shepherd of which, (who thought it an act of supererogation) I threw a turnep about as big as an half-penny loaf to a cow, and obliged him to stand with me to see the distress of the beast, in her attempts to masticate the turnep, which was attended with such difficulty to her, as convinced him of the prudence of the practice.—I would urge again, in defence of the practice, that suppose a man were to lose a beast of five, ten, or fifteen pounds value, would not that loss have paid for the slicing some hundred tons ? Besides, the turneps, which are raised in the common husbandry, will be more liable to choak cattle, than those raised in the drill : because there are very few drill-turneps, if properly cultivated, that cattle can get into their mouths ; but they will bite off large pieces, which is too slow a manner of eating for a *feeding* beast, or a working bullock, both which, ought to have their food so suited to their manner of eating, that they may soon fill themselves, and then take their rest.

I must observe to Agricola, that I do not think, I incurred any other expence \* in slicing my turneps, than what the candles cost which were consumed in that business ; for if my people had not been employed in that, they would have been idle ; and had I wanted more than about nine hundred weight in each day, I could have sliced them, as I seldom employ less than from twenty to forty, or fifty men and boys.—I must further observe, that instead of si-

\* It does not seem to invalidate the force of Agricola's argument, that Mr. Wynne Baker incurred no expence, but that of the candles, by employing twenty or thirty men and boys, two hours every day, who would otherwise have been idle at that time in slicing the turneps ; as others who have many more beasts, may happen, by having less tillage, on their hands, to have much fewer people ; or may find other profitable employment for them : and, therefore, the value of the work must be certainly taken into the account in stating the comparative advantages or disadvantages of any particular methods : however, it might chance to be in his peculiar case. E. O.



cing the turneps with sheers \*, I always use butchers knives, strong in the back, and about a foot long ; shorter knives will not make any dispatch, with my large turneps. We place planks, or strong sticks over the tubs, to rest the turneps upon ; when it is a pleasing sight, to see the people at the work, there being a constant emulation amongst them, contending who shall do most. But, upon the whole, whether the machine shall be compleated or no, I earnestly recommend, as a method, to lessen the hazard of choaking black cattle, at least an hundred, I might say, I think, a thousand degrees, to cultivate turneps in the drill way, which being properly persued, will, I do believe, always exceed the broad-cast, and hand-hoeing, in point of produce ; besides, the object of being less expensive, and always leaving the ground, in an higher state of perfection, than can possibly be in any other husbandry : which, *practice* has shewn with me, beyond contradiction.

I come now to speak of the turnep cabbage, upon which Agricola has been very full : but, as I have had long experience of its superior excellence, and that I see it warmly adopted by your Society, I think myself bound to give some further information, as to its nature and culture, for the benefit of your readers, as well as for the credit of the plant.

I have never seen the long species † of this plant, as described by your correspondent, p. 50 of your Sixth Volume :

\* Mr. Baker is very right, that he used no such expression in his report, as the cutting turneps with *sheers* ; nor indeed did Agricola in his letter : as appears, as well on the examining the manuscript, as by several other passages, where he says, the only method in use in these countries, is by the slicing with the *knife* and hand only. It was a typographical error, which happened to escape correction : and which, we are glad to have this opportunity of explaining to any, who may have taken the same notice of it. E. O.

† Agricola, in the passage of his letter here referred to, only says, that Gerard mentions two kinds of turnep cabbage, of which his long species was one ; and that he gave prints of them, which are also exhibited, at Agricola's desire, in our

lume: though I do not think it improbable, but there may be such a sort; as it is really surprising to see how nature has sported, in her variations of the plants, which we bring under the articles *brassica* and *rapa*. But, I once had a degenerated sort, similar to that which Agricola has described: which happened by my gardener's attempting, to raise the seed of the turnep cabbage, very near some borcole, of which we raised the seed the same year; but when I made that discovery, I banished the species, and had recourse to the original sort, which I now have in full perfection: and by the demands for the seed, have the pleasure to find, many gentlemen in this country, are embarking in the culture of it: which I hope will, with the premium offered by your Society, be a means of introducing it into general use.

I have had them weighing fifteen pounds; but I never had more upon an acre, than is mentioned in my report, including the leaves and turnep, exclusive of the roots.

I heartily wish, to hear of the culture of this plant being generally established: and as from my experience of it, your readers may perhaps be induced, to pay some attention to the culture, which I shall advise. And, therefore, I earnestly recommend them, not to disgrace the plant, by expecting it to prosper in poor ground; but that they will afford it ground well reduced, and enriched with manure. That they raise the ground in ridges of five feet broad; to do which, will require three bouts of a plough, *i. e.* six furrows; and let the ridges be raised as high as may be, (which, by so much, will increase the depth of the pulve-

work. He further mentions, that on examination, he "neither has seen, in any garden, nor finds any traces in the later writers, of more than one kind of this plant." So that it is not extraordinary, Mr. Baker also should not have ever seen the long kind, as an established species: but the fact he mentions, of some plants greatly resembling this, as described by Gerard, arising from the cultivating the turnep cabbage near borcole, supports much Agricola's conjecture, that what Gerard saw was a seminal degeneracy: notwithstanding Mr. Miller, in his Dictionary, says, "this kind of cabbage never varies." E. O.

rized



ized earth) and then harrowed; which ought to be done with what, I call my drill harrows, that do the business most conveniently: but rather, than suffer the common harrows upon the ridges, which would throw them down, let them be raked, on the crown, with iron rakes; which may be done for about twelve pence an acre. On each ridge, let there be planted, only *one* row along the middle; and the plants two feet from the middle of one plant to another, as has been my general practice: but never let them be put nigher than eighteen inches, and let them be horse-hoed in the manner my report describes.

Under this treatment, if the season be favourable, and the ground good, the leaves of the plants will grow to meet from row to row.—I am very sensible, from long and repeated observations, that many people will not be satisfied with the great spaces I propose: but they cannot *effectually* horse-hoe the plants, if the rows are nigher together: which, practice has taught me, is a circumstance of great importance; and, therefore, I hope, whoever attempts the culture of this plant, will be attentive to it.

To shew that cattle are fond of this plant, I am to inform you, that twenty head of my black cattle broke into my cabbage field in the night, some months ago, when they eat more of the turnep cabbage than of all the other kinds: of which, I think, there were fifteen sorts planted, by way of experiments.

I am very happy to see, that Agricola enters so warmly into my wish, of introducing this plant on board the navy: as it is an object, which has dwelt upon my mind for some years. And I really have warm hopes, that it may be attended with very happy consequences; as you may see by my preface to my report.

If any further information on this subject should be thought necessary, that is in my power to furnish, I shall most chearfully communicate it for the benefit of your readers and correspondents: amongst the latter of whom, I see you have some, who are entering upon the drill husbandry: from which circumstance, they have my

warmest good wishes: and, therefore, I shall just beg leave, earnestly, very earnestly, to recommend to their closest attention, two particulars, upon which depends the success and credit of that system.—First, that in their first attempts, they do not aim at the doing a great deal; and, secondly, that they attend most minutely to the important and very capital points of having their ground *well reduced, perfectly clean, and possessed of some tolerable degree of richness*. To obtain these three material objects, nothing is so effectual, as to sow turneps in drills for the first crop, in every field which is intended for the drilling of corn.—A love of this system, the honour I bear to the memory of the ingenious Tull, my own experience, and an ardent desire to see the too much neglected system of this ingenious, very ingenious man, established in his native country, induces me to throw out the above caution.

To return to my subject again, I must beg leave to set Agricola right in one particular. He says, page 46, Vol. VI. speaking of the turnep cabbage, “The stalk, “after rising of the usual thickness, and in the manner of “other cabbages, enlarges suddenly to such a degree, “that it forms a knob, &c.” He will permit me to inform him, that the knob or turnep appears by the time the leaves arrive to six or eight inches long, and continues to increase regularly, till it arrives to its full magnitude \*.

There

\* Mr. Baker has certainly much mistaken Agricola's meaning, as to the matter in question. In describing the figure of the turnep cabbage, Agricola says, that “the stalk, at some distance “from the ground, after rising of the usual thickness, and in “the manner of those of other cabbages, enlarges suddenly to “such a degree, that it forms a knob, of the magnitude of a “common turnep.” The use of the word *suddenly*, has obviously occasioned the ambiguity, that misled Mr. Baker, as to the sense of this passage: for undoubtedly Agricola did not intend it to have any relation to the time of the knob's being produced, but merely to the form of it, with respect to its going off by a quick projection, without a *gradual enlargement* of the stalk: and, in this manner,



There remains, gentlemen, two articles of information for me to furnish, in order to render my comparative experiments more intelligible to the bulk of your readers.

Wherever an acre of land is spoken of in my report to the Dublin Society, I always mean what is here understood to be an acre, which is called by the name of *plantation acre*. Five of which acres, make *eight English and fifteen perch*, statute measure.

The corn in this country is not sold by measure, but by weight, which I mentioned formerly to you, Vol. III. p. 74. and as it is material, to the forming a judgement of my experiments, I am to inform you, that the barrel of wheat here is two hundred and eighty pounds. The barrel of barley, and beer, two hundred and twenty-four pounds. The barrel of oats one hundred and ninety-six pounds. The barrel of peas two hundred and eighty pounds; and the barrel of potatoes two hundred and eighty pounds.

It is now, gentlemen, about nineteen or twenty months since you gave us some expectations of a Farmers Dictionary: I have for some time past wished to see it introduced in your work, as you promised; as I am persuaded it would be very useful, in making your readers mutually acquainted with the terms and phrases used in the different parts of England amongst the farmers.

This letter is much longer than I intended, when I set down to write it; and, therefore, I shall conclude, with only supposing, that it will be to no purpose for

manner, the expression *suddenly enlarging*, has been generally used by botanical, and many other writers, in similar cases. From several circumstances, we conjecture Agricola to be very conversant with the history of plants: and can, therefore, scarcely suspect him to have fallen into such an error, as to imagine, that a stalk of a plant, like those of cabbages, should be suddenly, in point of time, converted into the form of a common turnep: which transformation is so unlike any thing else in the vegetable œconomy, that it would almost require a miracle for its performance. E. O.

228 MUSEUM RUSTICUM, &c.

me to attempt the appearing again in your work; at least on the subjects which this letter contains, under an anonymous name; and, therefore, I shall, for this time, subscribe my real one.

I am, GENTLEMEN,

Your very humble servant,

Dublin,  
March 6, 1766.

JOHN-WYNNE BAKER.





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# Museum Rusticum, &c.

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For A P R I L, 1766.

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V O L U M E the S I X T H.

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N U M B E R XXXIII.

*Considerations on the Advantages, that might accrue, from the Establishment of County Societies for the Encouragement of Agriculture; and some Hints for the Regulations of such Societies.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

**I**N your last October and November number, I took particular notice of a passage, (in a letter signed Agricola, on the subject of the means of improving agriculture,) respecting county or neighbourhood societies: of which, he said, there was one established in Brecknockshire; and, as he believed, one or two more in some other parts. I wish we were more particularly informed of the success of these attempts; but, whatever that may be, I most heartily agree with Agricola in his notion, that the forming such, in other places, would be a very effectual method, both of augmenting the taste and spirit for improving

VOL. VI. No. 31.

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proving

proving husbandry in men of fortune ; and of imparting it to their inferior neighbours who have farms : and I think, also, as he further added, that if the result of the experiments and efforts, made by their encouragement, were to be communicated to the public through the channel of your *Museum*, or in any other proper way, that useful knowledge, of which, such endeavours could not fail to be a very copious source, would be adequately spread throughout the British dominions. I have since ruminated several times on this matter : and been solicitous to have it again urged to the public, either by Agricola, or some other capable person ; or, in default of that, to have sent you some observations of my own concerning it. But, on reading the St. James's Chronicle of March 29, I find it has been taken up by another, who makes it of such importance, that he seems to think, it might have an operation equal to the bounty on the exportation of corn : and that it is an object of parliamentary consideration and provision. I cannot say, that I altogether come into this gentleman's notions, either as to the probability or expedience of the government's revoking that bounty, and substituting a fund for county societies for giving premiums on the score of husbandry. They are things of a very distinct nature : and, though they may both be meant to tend to the same end, that is, the extension of agriculture ; yet they operate by means so different, that I cannot think one at all a natural substitute for the other. The forming such societies is, in itself, unobjectionable : and at all adventures eligible. The bounty is of more dubious consequence, at least in some conjunctures, as appears by the variety of opinions supported on both sides, by very plausible arguments, and by the very cautious deliberations of the government : but if it be a good measure, one would rather wish it to subsist concurrently with the other, even for the sake of that, than to be discontinued under the notion of making way for it. I hope, likewise, that there is public spirit enough to provide the moderate funds, which may be wanting for the disbursements of such societies, if they could



could be formed : especially if the premiums were to be, as they certainly ought, for the most part honorary. I know there are some who would dispute this point ; and say, that honorary rewards could have no influence, as to farmers, or the lower rank of people : but I am satisfied from observation on common facts of the contrary. There is an emulative spirit of excelling in certain matters, belonging to mankind, independent of rank or education ; which rather seem only to change the particular object, than to be the original cause. This is extremely manifest, by the great exertion we see in people of the meanest class, to gain a triumph, or carry away a prize in the rustic games and exercises ; as foot-ball, cricket, wrestling, or cudgel-playing ; which evinces, that the same spirit prevails as well in the lowest as highest ranks ; and, perhaps, with a more powerful enthusiasm, where this passion is excited in them. But there is an instance to be given more particularly close to the present purpose, than those I have here referred to. It is the success of a trial of this point made by a person of distinction in France, well known for his earnest application to the improvement of agriculture, and by his being at the head of one of the provincial societies, established for that purpose, from whence he corresponds with the London society. This gentleman offered his tenants and neighbours honorary premiums, for excelling, in certain particulars, respecting agriculture ; which they exerted themselves, with the most ardent efforts, to gain : and, having obtained them, wore them round their necks, at certain times of the year, in the field, as *insignia* of the honour they had obtained ; and were not less fond and proud of them, than a marshal or general would have been of those of some splendid order of knighthood. If the depressed peasants of France be capable of this sentiment ; surely it is not wanting in the breasts of the more liberal, independent, and substantial farmers of Britain. Honorary premiums would, therefore, I doubt not, have their due effect in all cases where no great expence is incurred, nor hazard run, in the attempt to obtain the prize : and

the other cases are so few, that a moderate provision for them would be sufficient. In this light, therefore, the aid of government would not be wanting to support them : as a private subscription, fully sufficient, would certainly be obtained with ease. But if the pecuniary support of government be not necessary, any other interference would be less so ; or rather, perhaps, greatly obstructive of the end. For in this country, or perhaps all others, whatever has any concern with the administration, is apt to become the object of party regard : and this would introduce such principles into the conduct of a society of this kind, as would greatly interfere with, or possibly wholly exclude those motives and sentiments, which alone can produce the just appointment and dispensation of rewards for merit in this way.

I wish Agricola, or some gentleman, who is well acquainted with the economical history of the societies of this kind, would give a plan, or, at least, a sketch of the regulations proper for such an institution : and, in the mean time, as an incentive to the spirit which must actuate individuals to begin such an attempt, that you would publish along with this the letter which has made the principal subject of it. For, though I cannot agree with the writer of it, in the particulars above mentioned, of wishing the government to undertake this matter ; yet, I think, the other parts of it very sensible and just ; and that they may conduce much towards a proper attention to this material design. In so doing, you will oblige

A constant reader,

And well-wisher of your Museum,

W. Z.

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*An Attempt to prove, that the Cultivation and Exportation of Corn may be still more efficaciously encouraged, by a Method subject to none of the Inconveniencies, and much less expensive than the Bounty; humbly offered to the Consideration of the Legislature.*

IT is well known of what infinite service the establishment of one private patriotic society has been to the public; but by its being removed out of sight, as it were, scarce one farmer out of ten, nay, not one in a hundred, at a distance from the metropolis, is even acquainted with its existence: but how much greater, how much more general, would be the influence of so powerful a spur to industry, if, by the establishment of a like society in every county, and the yearly distribution of prizes in its capital, it became the constant topic of every countryman? Every premium it proposes would be known, and be within the reach of every farmer; and by thus constantly proposing to each the means of triumphing over his neighbour, would necessarily engage the attention even of the most indolent. The society should be composed of the most independent gentlemen of the county, with proper power to enlarge or supply their numbers. To avoid every idea of lucre, they should not only give their attendance *gratis*, but as an earnest to the people of their disinterested views of encouraging the object of their meetings, each member should, at least, subscribe a guinea *per annum* to the stock allowed by parliament. To a sufficient number of them must be committed the care of regulating and publishing the premiums; which should be done by bills pasted up on each parish church and market cross. They must superintend, and be present at the trials, and receive the affidavits, necessary for fixing the reality of the several pretences of the candidates. With regard to corn, to the encouragement of which the premiums are chiefly to tend, it is necessary those trials should be by the hundred weight, and not by measure, as the only secure method of fixing the value

value of it. When the several claims are adjusted, a day should be fixed, on which a sufficient number of the members are to attend, to distribute the several prizes and medals in the most public manner, accompanied with every thing that can add dignity and importance to the occasion; after which an entertainment is to be given, in the town-hall, at the society's expence, to which each person, who has obtained a premium, shall have a right to invite a certain number of his friends: as for example, the first premium six, the others three, to whom tickets shall be given. Along with the money allotted for each premium, silver medals ought to be given to the persons to whom they are adjudged; on one side of which is to be engraved the person's name and place of abode; on the other, the object of it; and if that be corn, the number of acres, and the quantity *per* acre by which he obtained it; the particulars of these to be enrolled likewise in a book, kept by the society for that purpose. With regard to the objects of the premiums, as before said, their chief tendency should be to the encouragement of bread-corn; the plenty of which is the first point to be obtained: but as the good culture, necessary for the producing of barley and oats, and even artificial grasses, is a real, though a more distant preparation of the ground for the bearing of wheat; and they too are necessary for the subsistence of the husbandman and his cattle, they will not improperly be allowed some share in the premiums, and to render the institution still more extensively beneficial, such other crops too, as hops, woad, madder, hemp, flax, rape; with inventions, which have an immediate relation to husbandry, and such manufactures as work up materials, producible by the soil of the several counties; the planting of forest-wood, and even willows, as useful to the farmer, should be allowed a place in the distribution; for though these have not an immediate relation to that branch of trade, for which the bounty is at present given; yet they all contribute to the general improvement of agriculture, and by procuring general plenty, enables the husbandman to carry on his work with greater facility.



facility. The manufactures here mentioned, conduce to his general profit, and must be allowed to constitute the only solid basis of a truly advantageous commerce.

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## NUMBER XXXIV.

*An Account of an Improvement in the Method of ploughing Ground, by Means of a Plough of a new Construction (here described) by which much greater Crops may be obtained, without any additional Expence or Labour, than by the Use of the common Plough; with Observations on the Effects of frequently repeated Stirrings of the Soil; and the comparative Benefits of that, and laying on Dung.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

I HAVE but little time on my hands: but such is the advantage to the nation, of properly ploughing the ground, that I willingly offer my best assistance, in this particular, to any of your readers, who may think fit to try the event of what I advise. Were the common ploughs without wheels, faultless, such is the custom of the greatest part of ploughmen, in holding the right-hand higher than the other, for the greater ease to themselves, or a slightly surface, to mend the defect of the plough, that the ground cannot be properly prepared beneath, to give the fibres of the roots of the corn free admission into every recess, in their search after nutritive principles, in order to carry on vegetation, according to the true bias of nature; and to bring the crops to their destined maturity \*. I beg leave, therefore,

\* Both we, and the public, are much obliged to Mr. Ladnar for this ingenious and important communication. There can be no doubt of the certainty of the principle, *that the exposure of the earth to the air*, by frequently repeated turnings up of the ground, will fertilize and enrich it, as well as manure, in soils that are naturally,

therefore, to recommend the making of a double plough, with the following proportions. Let it be eighteen inches in the tail, and three feet in length; with a double share, eighteen inches from wing to wing; and two mould boards, which should have a pretty sharp turn. This plough will work very well in all soils; which are not of the stiffest nature: and the ploughman cannot easily hold it otherwise than even, without some pain to himself. Now, if the owner pleases to recollect, he will find he must make quicker dispatch in ploughing his ground; and, not only so, but give the land two stirrings. In the common mode of fallowing, every bout the team goes; that is, in the usual way; he cuts nine inches of ground, and one stirring in ploughing his field throughout: but, in this, he cuts eighteen inches at a time; and, when the whole is once ploughed throughout, he will have stirred it twice: which has the effect of two ploughings for one in the common method. It may seem, that a double draught will be required to work this plough: but this is far from being the case; as I have frequently experienced: and the reason arises from this, that the share point always exactly follows

naturally, or have been brought to be by art, of a due looseness of consistence: or, in other words, are not too stiff to be broken into small parts. This doctrine is manifestly verified by some late accounts given in to the Society for promoting arts, &c. of the comparative advantages of the drill or broad-cast methods of culture; where the purposes of dung appear to have been entirely answered by the manner of tillage in the drill culture; and, taking the term of five or six years together, greater crops obtained by that method, than were formerly in the same period from the same land in the broad-cast way, by the common course of fallowing, and the use of manure. The extension of any improvement, which renders manure wholly, or in part needless, cannot but conduce greatly to the advancement of agriculture: because the limitation of the quantity of such manure, &c. which necessarily rises in its price, according to the increase of the consumption of it, in any neighbourhood, gives a proportionable limitation to that improvement of land which depended on it. But mechanical operation may be practised unlimitedly, and is, therefore, an inexhaustible resource of the benefits which accrue from it. A. R. E. T.



the horse's path; whereas, in a single plough, the share must point to the left, in order to balance the resistance of the mould-board: whereby, the horses have more labour, than if the share pointed directly after them, as in my method. Besides, in the common plough, the share must incline downwards, in order to balance the defect of the angle made by the beam, and the ground; otherwise, the horses would pull the share upwards; and this necessary tendency of the share to point downwards, occasions also much labour to the horses.

Great is the benefit to the owner of the ground, by using this plough: as every intelligent man in husbandry must acknowledge, the more stirrings of the ground the better crops. In the common method, there are four ploughings, we will suppose, commonly practised; which will give only four stirrings: but, by this double plough, there will be eight stirrings from four ploughings; and the owner need not be surprized, if he gets as good a crop by these four ploughings, according to my plough, without dung; as he can with four, by the common plough, with dung: provided he will begin his fallows before the winter, and will see the ploughings made in all seasons when the ground is in proper temper to bear the horse's tread. It will be very favourable to the crop, if the ground will admit of cross-ploughing, as it will remedy any heedlessness, in the ploughman, if he have failed to hit the ground in entering the plough, every time he turns on the headlands, or do not keep a due distance from each furrow in bouting: which he may easily do, if he pleases.

The reader need not be told, that, after the first ploughing, the ground lies in ridges; and that, at the second operation, those ridges are thrown into the first furrows; and then, the ground has had one ploughing throughout: and so on, for three more such stirrings. If he considers the nature of this mode, how the soil is exposed to the frosts in winter, and the scorching heats in summer, he may well expect from it the full effect of fallowing: the design of which is not only to destroy the weeds; but also

to introduce into the pores of the soil, all the riches of the atmosphere. For, without that aid, land will be poor indeed; and unable to push on vegetables to their maturity, unless by forcing with dung; which too often ruins the tone of such exhausted matrices; that can only be gradually recruited, by the mild and benign principles, treasured up over our heads, after we have prepared the land for their reception. Let the soil be rough in the various fallowings; and the chemical principles of the atmosphere, will only adhere to the surfaces of the larger lumps, whence there can be no fermentation, nor consequently a proper motion to excite vegetation. Let the soil be made fine, in the operations, and the influences of the atmosphere, by having free admission, will intimately adhere to the finer lumps; and bring on a well-tempered fermentation; still more refine the soil; and, by this true bias of vegetation, bring the crops to a lovely maturity.

It is very certain, that the atmosphere imparts to the soil, when made properly fine, the same nutritive principles as are contained in dung. The truth is, these influences of the atmosphere do not act on the crops, with the same violence, as the dunghill; but they are more durable in the execution of their office; and do not injure the mould, which cannot be said of forcing ingredients. To be sure it is the greatest mismanagement, to make the land fine, before we sow the seed, when we are sensible the ground is full of weeds, since that is the ready way, to destroy most of the crop. But as we know the cause of our calamity, we should take proper methods to remove it; and what these are, has been made very evident in two performances, now in the hands of many gentlemen, who find the happy effects. An earnest desire, to promote the interest of agriculture, and to render the profession of a farmer more comfortable, and less hazardous, are the motives of sending you this letter. And, surely, if ever the business of farming be carried to any desirable perfection, it must be by making and publishing experiments, within the power of every ploughman to execute, otherwise they are made to no purpose. The subject of this letter is  
nothing



nothing less than what has been confirmed by repeated experiments; and, therefore, as it is not the product of fancy, some of your readers will, I hope, alter their opinions, and set about making an essay on an acre, or rood, of land, of what is herein recommended to them to be tried, for a public good, and their own benefit: and thereby effecting the happiness of those, who bless the nation with their endless toil, in tilling the ground.

The mode of culture, by this double plough, is but a small part of the system of experiments, which I have made: and no doubt other persons also, in the practical parts of husbandry, may have done the same: and then, surely, if your readers were to publish \* such solid improvements in your *Museum*, there would be less room in it for what has only a remote tendency to raise the fabric, by the addition of such *minutiæ*. I must tell you, though this is the first time I ever troubled you, that I have always looked on your undertaking as extremely well adapted to obtain the noble end of carrying agriculture to its utmost improvements; which I hope will be the restless struggle of all your readers: than by doing which no one can better deserve the name of *Utilium sagax*, as Horace calls him.

I am, GENTLEMEN,

York, Mar. 29, 1766.

Your obedient servant,

J. LADNAR.

\* As Mr. Ladnar here mentions, "this is but a small part of the system of experiments he has made:" we hope, he will set the farther example to others, whom he calls upon to impart, the improvements they make, to the world, by extending the benefit of more of his discoveries and observations to the public. We shall always, on our part, be extremely ready to give them a place in this work: and to be furnished with so just an excuse, "for excluding those *minutiæ*," which he says, "have only a remote tendency to raise the fabric," we attempt to erect. We presume, and it is apparent to our readers, we have just ground for it, that our later numbers have given little reason for this remark: but in the first attempt to execute such a plan as this, it could not be expected, an adequate correspondence would be obtained under some time, for the supplying constantly such a quantity of very important matter, as the volume of the work demands, especially as the death of the late Mr. Wych deprived us of a very material promised aid. E. O.

## NUMBER XXXV.

*An Account of the State of a Piece of Ground cultivated with Burnet; and its Effect in feeding Cattle and Horses: In a Letter from the Kentishman.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

**M**Y two acres of burnet, seem now to have overcome all the difficulties they had to encounter with; and are in a fine flourishing state: except the small wet piece; and that has not totally failed. I had a cow staked upon it last summer for several days for a churning. The butter was very good: and I had, several times last month, sheep and young lambs turned upon it, all of which eat it. Some horses also will eat it: but I have never seen one, that eat it \* greedily, though I have had a great many tried, and even immediately after they have come from the plough. Several other people, likewise, have tried their horses, who have come to see the burnet, when I have been with them, and with the same event. However, I intend, as soon as it is long enough, to have some of it cut, and given to the horses in the stable, in the manner we do clover: and, if they will eat it this way, and if it will come to be fit to cut sooner, for this purpose, than clover, it will be very valuable; and an advantage for every farmer to have some of it near his stable. Time now will soon determine this particular point.

I am, GENTLEMEN,

April 7.

Your most humble servant,

The KENTISHMAN.

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\* What our correspondent says, of his horses not being fond of burnet, agrees with several other accounts of the same matter; and seem to give reason to believe, that horses in general are less inclined to like that herb, than horned cattle are. There  
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## NUMBER XXXVI.

*Further Considerations on the Practicability of producing Silk in England, with Advantage to the Undertakers: And on the Means by which that most valuable Article may be introduced: In a Letter from Agricola.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

**I**N my former letter to you, on the subject of *the practicability of producing silk in England*, I gave a sketch of that system of facts and reasonings on them, which have induced me to believe, that it might be done with great  
advan-

appears, however, to be a greater variety in the disposition of beasts, of every kind, to eat or refuse burnet than any other plant, hitherto cultivated with a view to feeding them: and there is certainly a little mystery in it, that depends on more than one principle.

It is alledged, on unquestionable authority, that, in some places, not only neat cattle, and sheep, but even horses, are greedily fond of it. In others it is proved, by equal evidence, that some of them obstinately, even to the risk of starving, refuse it, and that others can with difficulty be brought to touch it. Again, there are places, where some beasts of the same kind show no disgust to it; and others either seem to have but little relish to it, or strongly reject it. In this extraordinary variation, therefore, burnet differs from any kind of plant cultivated for the purpose of grass. It is indeed true of several other kinds, that particular beasts, whether cattle, sheep or horses, who are not accustomed to them, will slight or refuse them, with various degrees of indifference or dislike, and this is accountable for, from the variety of tastes and likings we see in most kinds of animals. But this principle will by no means be sufficient to account alone for the facts we have mentioned, as observed with regard to burnet. If this was the sole cause of the refusal, it would be only now and then, one beast among numbers, that would show the dislike, while the rest would be content; and not the whole number together in some places, that would show  
their

advantage to any undertakers, who should manage it with due skill and assiduity, as well as to the public. I had then sufficient lights to form a very satisfactory opinion of this matter; but the more I inquire into, and consider about it, the more subsequent information and conviction I gain.

With respect to the two circumstances, on which the objections of difficulty, as to this country, are founded; the *coldness of the climate*; and *the price of labour*; the following facts have greatly confirmed my belief, that they are erroneously urged, as reasons against the profitable introduction of this article.

On enquiring very minutely from persons well acquainted with this matter, I find, that in all the more southern climates, the worms frequently suffer greatly from sultry heat, especially when attended with moisture; that they are subject to epidemical diseases, on that account, which frequently make such ravage among them, as to destroy nearly

their disposition either for or against the plant. It is certain this cannot be the effect of chance; but of some real local difference in the circumstances, which determines this in the places, where all eat or all refuse; and it certainly ought, as we intimated in a former note, to be ascribed to some variation of the qualities of the soil, that renders the burnet agreeable, or loathsome, in various degrees, to the cattle. This accounts properly for the extremes of the difference in the beasts, by supposing the qualities of the soil to vary in proportion. Where we find some beasts choosing, and others rejecting the plant in the same place, we may suppose the soil in a middle state, with respect to these qualities; and that the other principle of variety of tastes, and likings in the beast, comes in for its share of the effect. By these two principles thus co-operating, the mystery may be unravelled; and we may comprehend how a difference so uncommon, and dissimilar, to the general disposition of beasts, as to any particular kind of food, happens to be found in this case. What the cause of this variation of soil, admitting the fact, may be, future observations will probably bring to light. But the refusal of cattle to eat it in particular places, is not in the mean time an objection to its being cultivated in any others: and should have no other influence, than to excite a caution to try, in smaller quantities of ground, the effect as to this particular, before larger are undertaken. R. E.

the



the whole stock; that, in temperate weather, they are most healthful and exempt from danger; and that, moreover, next to these diseases, which arise from heat and moisture, thunder is their greatest enemy: generally giving them a visible temporary sickness; and frequently a more continued, such, indeed, as does not cease till it destroys them.

Now, if we compare with our own, the climates, where most of the silk we purchase is produced, certainly, in relation to the points, we have above enumerated, instead of disadvantages, we have several very material circumstances in our favour; and, by proper management, may avoid the greatest part of the hazard of losing the silk-worms.

If we have, ever, so great heats, they are rare and seldom durable; while, in Italy and Greece, on the other hand, they are frequent; nay, even constant, in a degree nearly equal to our greatest. So that as to this excess, we have greatly the advantage. If we have, during that season in which the silk-worms live, more cold weather than is liable to happen in those climates, it admits of a certain remedy, by the means of stoves: which, combined with proper ventilators, may be made to afford the most genial warmth, attended, at the same time, with a constant change of air. This will contribute greatly to the health, and vigour of the worms, to which fresh air is particularly beneficial: and the warmth may be regulated by the assistance of a common thermometer, to a much more accurate degree, even than is required. In this particular, therefore, we have a superiority over the hot countries: since, there is always, by the means here pointed out, an effectual and adequate remedy, for too great coldness in the weather: whereas, there is no expedient applicable in this view, for producing a greater coolness in the places where the worms are to be kept, than is at the same time found in the circumambient atmosphere.

As to the mischief arising from thunder, we are, according to what has happened of late years, peculiarly exempt from it: and they, who are well acquainted with the  
econ-

œconomy of silk-worms, must allow this to be a very material difference in our favour.

The coldness, as far as it may affect the silk-worms themselves, is, therefore, no valid objection : but the most specious appearance of difficulty, arising from the state of our climate, lies in the hazard, that the eggs may, by the variableness of our spring weather, frequently hatch, and bring to life the silk-worms, before the mulberry-trees are in a sufficient forwardness to afford them food. And, indeed, if art could not interpose, according to the natural state of things, there would be too much force in this objection. But experience has shewn, that the hatching can be retarded by artificial methods : and that, though the manner of it has not been hitherto improved, so as to extend to every case, where it might be available, yet the principle is so simple, and of such a nature, as admits of no limitations or variation of circumstances, where it could not be effectually carried into practice. The sole reason why the eggs hatch at a particular season of the year, is, because that season is warmer ; and, consequently, wherever there is a privation of that heat, they do not hatch. The heat of an human body, continued a due time, will always bring them to life ; and the coolness of a cellar, will retard their progression to that state, when the warmth of the atmosphere, in places where the sun has access, would make them hatch. This is a sufficient security against a certain degree of warmth in the weather : but where the coolness of vaults fails, that of water, frequently changed, into which the worms, inclosed in a proper phial or bottle, are put, is found to succeed : and it would be very easy always to render water so cold, either by the addition of a small quantity of ice preserved for that purpose, as it is for the table, or even by that of neutral salts, dissolved in the water, to make it resist sufficiently the greatest heat of the atmosphere, so as to keep the eggs in a condition, as little tending to come forwards in April, or May, as they were in January or February.



This difficulty being removed, there is nothing different in our climate, from those where most silk is produced, but what, compared with that of the silk countries, throws the balance on our side, as to the silk-worms themselves; and as to what regards the mulberry-trees; supposing us able to retard at will the hatching of the eggs, we still stand in a fairer light; for those trees not only flourish well, and admit of being propagated from sets or cuttings, but are more secure, as I mentioned in my former letter, of supplying their leaves duly after the buds are once opened, than in some of the countries, which afford the most European silk. So that, with respect to the propagation, and cultivation of mulberry-trees; or their fitness to feeding silk-worms, excepting the circumstances of their coming later into leaf, the inconvenience of which is obviated by the means above mentioned, of keeping back the hatching of the egg, there is not a shadow of disadvantage on our side: but on the contrary a manifest advantage, in our being exempt from the blighting of the leaves. There is, indeed, one other objection, I had almost forgot, which Mr. Pullen, in his book, takes some pains to answer, though he does not seem, intirely, to admit the fact on which it is founded. This is, that the silk-worms are said to degenerate in colder countries: and to require to have the breed renewed from hotter. This has been borrowed from some French authors, who say, that fresh silk-worms must be had, every four or five years, from hotter countries; and most probably took its rise, from observations made, in the earlier time of the attempts, to produce silk in France, when not being well skilled in the management, the breed grew weaker from being treated in a manner, which gradually injured their health, though it did not destroy them. There is not the least reason to suppose any other principle of degeneracy than this: nor is it the practice, at present, to renew the breed in this manner in France.

Mr. Pullen appears, however, to suppose, there is something of this kind liable to happen, from the silk-worms not being bred and fed in its natural manner; that

is, in the open air on the trees themselves : and he proposes an experiment for the finding out a remedy for this kind of degeneracy, by putting, those which are designed to breed, out upon the trees. But a very extensive field of experience shews this notion of such a degeneracy, to be erroneous ; though it is on the first view specious. The particular species of moth, from which we obtain the silk, is not, as is generally imagined, a native or indigenous animal, of perhaps any of the countries, where the silk we have is produced : nor is it found wild in them ; unless in consequence of some of the moths having escaped from the places where they have bred by art. And it would not perhaps even be easy, to find the place where they were originally taken ; or consequently to obtain them, by any means in a natural state. There is very good authority for believing they were at first discovered in some part of China, or Tartary, where, perhaps, they are far from abounding ; or may be naturally very rare, as is the case of many species of moths. In China, where the production of silk by art is most antient, the silk-worms are, and have indeed always been bred and managed in houses, from the first introduction of them as a subject of art, which is a very long period of time : and yet if we may judge by the silk produced, the silk-worms in that country must be in the highest state of perfection at present. Nor is there, that I can find, the least authentic traces of any place, where the true species are bred or fed in trees, in order to afford silk. There have been such attempts, of which we have some account : but good fine silk was never produced in that manner, nor perhaps any considerable quantity, even of bad, from the true silk-worm. There is a coarser kind of filamentous substance indeed, which the Chinese do produce from caterpillars living on trees in the open air : but it is obtained from a very different species of fly.

Mr. Pullen appears to have made a mistake with respect to this point, from having heard some general account of the Chinese practice of putting the silk-worms on the mulberry



berry-trees ; and not having seen the passage in Du Halde's history of China, from whence that account was taken. But this is the reality of what is there related. " The  
 " province of Shangtong (says *Du Halde*) yields a parti-  
 " cular filk, found in abundance on trees and in fields.  
 " It makes the stuff called Kyen-chew. This filk is pro-  
 " duced by small insects, very like caterpillars. They  
 " do not shape it into cods, like the filk-worms, but in  
 " very long threads, which stick to small trees or shrubs.  
 " These threads are gathered, and make a coarser filk  
 " than the house-worms spin. But the worms are wild,  
 " and eat the leaves of other trees, as well as those of the  
 " mulberry. Such as are not acquainted with this filk,  
 " would take it for a russet stuff, or coarse drugget.

" There are two sorts of worms which spin this filk,  
 " one larger and blacker than ours, called Tswenkyen ;  
 " the other, which is smaller, is called Tyankyen. The  
 " cods of the first are of a russet grey ; those of the latter  
 " more black ; and the filk has a mixture of these two  
 " colours. This filk is very thick, never cuts ; lasts  
 " long ; wastes like linen ; and, when good, will not  
 " stain, even with oil. This filk is in great vogue among  
 " the Chinese, and is sometimes as dear as sattin, or their  
 " best-wrought filks. As they are very dextrous in coun-  
 " terfeiting, they make a false Kyen-chew of the waste of  
 " the Chekyan filk ; by which, without care, one may  
 " be easily deceived."

In the extracts which Du Halde has given of an antient author, who has written on the production of filk, &c. there is this further passage respecting the same filamentous substance obtained from these caterpillars hatched by art in houses, and put out afterwards on the trees to feed themselves : " There are (*says he*) some worms no sooner  
 " hatched in the house, but they are laid on these trees  
 " (*meaning a kind just mentioned before, obviously not a mul-*  
 " *berry-tree,*) where they feed themselves, and make their  
 " cods. These field filk-worms, being more hardy, grow  
 " thicker and longer than the domestic sort : and though

“ their work is not so good, it is valuable and useful, as  
 “ may be judged of by what I have said of the stuff called  
 “ Kyen-chew. Strings for musical instruments are made  
 “ of their silk ; because it is strong, and resounding.

“ Du Halde mentions below, that the field-worms, as  
 “ he calls them, will feed on oak-leaves, and produce  
 “ their silk.” It is unquestionably evident that these animals are intirely a distinct kind from silk-worms.

If therefore Mr. Pullen had seen these passages in Du Halde, he would have perceived that it is not the silk-worm, but a moth of a very different species, not producing silk, but some other filamentous substance that serves in China as a substitute for it, which the Chinese put out on trees to obtain their product. It would undoubtedly have prevented his conception, that silk-worms degenerate from the being out of their natural state : and also taken away the supposed foundation for the queries, which he has put at the end of his treatise, on the imagination, that the Chinese ever treat the silk-worms, in any other way, than by keeping them always in houses, and breeding, feeding, and managing them, much in the same manner, as is practised in Europe.

If we were indeed to leave particular facts out of question, respecting this case, and recur to general principles, the supposition, that animals degenerate, with relation to those qualities which fit them for peculiar human purposes, is far from being generally true. For many of those qualities are in no degree so prevalent in the natural state of the respective animals, as when under the management of art, either exercised on the breed, or individuals. We find them, on the contrary, often greatly improved by cultivation : and that a depravity follows the restoring the subject to its original œconomy. I cannot therefore doubt but that great care to preserve the health and vigour of the silk-worms, and the selecting for breeders only such as appear most hearty and vigorous, would be an effectual way, to keep the breed of silk-worms perfect.

I have been the more explicit on this point : because it is an almost general notion among those, who are not acquainted



quainted with the history of this matter, that silk-worms are natural to the European and other countries, where silk is produced; and that they are really bred and kept for spinning on mulberry-trees in the open air. This mistake suggests an opinion of the comparative difficulty of their being profitably managed here; and so consequently affords one source of discouragement which it is very proper to remove, by shewing that no one single circumstance of trouble or expence is requisite here, except the retarding sometimes the hatching of the eggs, and the warming the rooms that is not equally so in all other places where fine silk is produced.

The unwholesomeness and disagreeable smell of silk-worms, has been, with equal error, urged as an objection to them. But it is the supposition of a false fact, arising from the consequences of the neglect or ignorance of those who have managed them improperly. For if they be kept duly clean and in health, and the places where they are bred and fed are properly ventilated, neither the animals themselves, nor the mulberry-leaves, have any *effluvia* or smell, that are in the least noxious or offensive: and experience in hotter countries, where such effects would naturally be aggravated, has shewn this notion to be very groundless. Whoever produces good silk, will have no inconvenience of this kind, from the silk-worms: for a remissness in duly removing what might be disgusting, will either soon destroy the animals; or at least frustrate the end of keeping them, by rendering them incapable of affording good silk.

I shall, now, say a few words as to the objection made on account of the price of labour; and the other expences attending such an undertaking, being too great here to admit of its being profitable. What I said in my former letter, concerning whom the persons are, and what their present situation is, that are proper to be employed in this work, evinces, that hands might be had for this purpose at very reasonable rates. I shall, therefore, only add a matter of fact, for the knowledge of which, I am obliged to a gentleman of great probity and ingenuity, who has  
resided

resided a long time in Greece. It is this: that the hands engaged in that business generally earn, what is equivalent to *five pounds sterling*, during the *six weeks, or thereabouts*, they are employed in it each season. Now, if the additional charge on this five pounds, in commission, merchants profit, freight, duties, &c. before the silk comes to market here, be added to it, we may well account it seven or eight pounds; which would be much more than sufficient to hire women and children, that are now starving for want of employment.

The making and cultivating a plantation of mulberry-trees is the other considerable article of disbursement: but if we examine what little expence attends this, after the first planting of such trees; and how great the return may be proportionably; it will shew, instead of discouragement, the greatest prospect of advantage. In France, above fourscore years ago, when the price of silk was greatly lower than at present; it appears from a passage in Mr. Locke's *Observations on the Growth and Culture of Wines, and Olives, and the Production of Silk*, lately printed from the original manuscript in the possession of the present earl of Shaftsbury, that the leaves of a moderate mulberry-tree afforded, when sold for feeding silk-worms, above five shillings. He says, speaking of the south of France, "Their mulberry-trees, where they stand near towns, yield them good profit. I have known the leaves of four white mulberry-trees (some whereof were not very large) sold for a *pistole*, i. e. *between sixteen and seventeen shillings sterling*." Now if we reflect, that above six hundred of these trees can grow in an acre of ground; or a proportionable number of such as are less; it appears, that the expences in producing silk, labour excepted, are extremely small in proportion to the return: indeed, almost nothing, after the buildings and utensils are provided; and the plantattion of mulberries completed.

At the present conjuncture, when the price of silk is so very high, there seems nothing wanting to give us the fairest prospect of great national advantages, as well moral as commercial,



commercial, from the establishment of undertakings for the domestic production of it, than an adequate attention and spirit in those whose property and leisure make them fit patrons of such designs. The ladies of Great-Britain, in particular, might on this occasion most eminently shine in a political capacity ; and every individual of them at once display their ingenuity and patriotism.

Certainly, they, who should thus, acting in their own proper sphere, do service to their country, would merit more honour than is due to the publishing the most elaborate speculations on liberty and the British constitution. Without invading the male character, a lady might, in this way, greatly advance the commercial, now the most essential interests of her country ; feed and clothe the necessitous poor in her neighbourhood with little expence, and, what is more important, reform their morals, as well as supply their wants ; provide a comfortable and reputable establishment for some dependent relation or friend ; and obtain, at the same time, a most rational and agreeable amusement to herself. It is not to be supposed, that the whole of our great demand for silk would be this way answered ; but, if beginnings were thus made ; examples set ; and demonstration presented of the practicability and profit of such undertakings ; others would soon be induced to engage in it, from lucrative motives ; and the very great private benefit, that might result, while the present very high price of silk holds, would, in all probability, occasion a rapid progress of this most valuable product.

As an additional incitement, therefore, to ladies, and as an apology, likewise, for my addressing them so particularly on this score, I must not omit to mention, that it was a great princess, to whom the world owes the invention and introduction of the use of silk : by which, she relieved the distress in which her subjects were from the want of clothing ; furnished their posterity with the means of enriching their country, the most populous and extensive in the world, by the various arts employed in the manufacturing this material ; and introduced an article of  
great

great utility, as well as luxury, to almost all the civilized countries in the world. That the example of this princess, who was an empress of China, may be more striking, and have greater influence, I beg leave to insert here the account which Du Halde has given us of this discovery, from some antient Chinese authors, who have written on the production of silk : and whose account of the nature, manner of breeding, feeding, and treatment of the silk-worms ; as well of winding off the cocoons or silk balls, in order to the forming what is called raw silk ; tallies, in so extraordinary a manner, with the present European practice, as leaves no room to doubt of the authenticity of the book.

“ *Greece* made *Italy* the rich present of silk, which, in  
 “ the time of the *Roman* emperors, was valued at its weight  
 “ in gold. The *Grecians* were beholden to the *Persians*  
 “ for it ; and they, according to authors of most credit,  
 “ as M. d’*Herbelot* observes, confess, they had the know-  
 “ ledge of silk-worms, and the art of breeding them, ori-  
 “ ginally from *China*. The most antient *Chinese* writers  
 “ ascribe their discovery, to one of the wives of the em-  
 “ peror *Whang-ti*, her name *Si-ling* ; and surnamed, for  
 “ honour’s sake, *Ywen-fey*. But it is difficult to meet with  
 “ any memoirs of an early date, that mention the silk-  
 “ worm. Before the time of this queen, when the coun-  
 “ try was but newly cleared, the people were clothed in  
 “ skins of animals ; which being insufficient for so multi-  
 “ plying a people, necessity rendred them industrious ;  
 “ and they exercised their invention, in making cloth to  
 “ cover themselves ; but they were obliged to this prin-  
 “ cess, for the useful discovery of silk.

“ Since her time, several empresses, recorded in Chinese  
 “ authors, have been agreeably employed in hatching,  
 “ and breeding of silk-worms ; in feeding them ; collect-  
 “ ing the silk ; and manufacturing it : and an orchard of  
 “ the palace was allotted for a plantation of mulberry-  
 “ trees. The empress, attended by the emperor’s other  
 “ wives, and the great ladies of the court, went in cere-

“ mony



“mony to this orchard ; and gathered, with her own  
“hands, the leaves of three branches ; which her maids  
“of honour bended down within her reach. The finest  
“pieces, made by herself, or by her order, and under  
“her eye, were devoted to the ceremony of the grand  
“sacrifice offered to *Shang-ti*.

“There is reason to believe, that the trouble the  
“empresses thus gave themselves, was chiefly with a politic  
“view, to engage, by such examples, the princesses, the  
“ladies of quality, and all the people in general, to breed  
“silk-worms : in the same manner as the emperors, in  
“order to ennoble, in some degree, agriculture, and ex-  
“cite the people to so laborious an employment, always  
“observe, in the beginning of the spring, the ceremony  
“of holding themselves the plough, opening with it some  
“furrows, and sowing grain in them. The present em-  
“peror still keeps up this custom. As for the empresses,  
“they have, for some time past, not concerned themselves  
“about silk : though there is yet to be seen, within the  
“verge of the palace, a large square of houses, where  
“stands the church of the French Jesuits ; the avenues  
“to which, is still called, *the way to the nursery of silk-*  
“*worms, for the diversion of the empresses and queens.* In  
“the books of the antient philosopher *Mengius*, we meet  
“with a wise regulation of the magistracy, which limited  
“the place appointed for the mulberry plantation, accord-  
“ing to the extent of every private man’s possessions.

“We may well call *China* the *Silk Country* : for it seems  
“to be inexhaustible of that commodity. Besides furnish-  
“ing the nations of *Asia*, and *Europe*, with large quan-  
“tities, the emperor, the princes, and their domestics,  
“the *mandarins*, the *literati*, the women, and, in short,  
“the generality of the *Chinese*, wear silk ; and are clothed  
“in sattin or damask. There is scarce any excepted, but  
“the meanest of the people, and the peasants, who wear  
“blue cotton.”

This is the account given by Du Halde, of the very im-  
portant and meritorious discovery, and introduction into

use, of silk, by a great princess, empress of the most populous and extensive country in the world. If it would not appear a presumption, to seem to pry into and disclose the private transactions of great personages, I would enforce the influence of this great example of royal patriotism, by the further instance of another illustrious princess, who I have reason to believe, is engaged at present in the same pursuit. From her great and good qualities, so eminently observable by those, who have the honour and happiness to be near her person, we may justly hope, that when she is convinced of the practicability of this matter in the country where she now reigns, she will exert her influence in procuring the same advantages to her subjects, as the empress of China formerly did with so much success, and glory: and render it in like manner fashionable for ladies of the first rank, to assist in this great work; to the establishment of which, such a patronage only is wanting.

After this address to the ladies in general, I must make another to one gentleman in particular, in whose power it is to promote this matter, by means, that could not fail of success. The gentleman, whom I would exhort to an act so beneficial to the public, is the same, whom I mentioned, in my former letter, to be possessed of the Chinese art of the managing silk-worms, with advantages unknown to the Europeans: and whom, I am informed, is returned home. If he be possessed, as I presume he is, not only of the secret of having successive products, as he informed me, in the same year, but also the manner of producing that kind of silk which is *white in its raw state*; it would give incredible advantages to the silk trade here. It is in his power, not only from this knowledge, but from certain circumstances and connections, not proper to be mentioned, to put this design immediately into the most vigorous motion: and it is on him, therefore, I call for his own honour, and for his own country's sake, to exert the ability, his situation gives him, to accomplish this momentous purpose.

I shall for the present conclude here: but, that I may not attempt to incite others to undertakings of this momentous



mentous kind, without lending all the aid to them that is in my power, I will, at my leisure, impart to you what I have collected of the means of breeding, feeding, and managing silk-worms, in order to the obtaining from them, the silk in the greatest perfection. The first step to this is an adequate plantation of mulberry-trees : and the executing it with the least expence, trouble, and hazard, shall be the subject of the next letter I write to you, on this article.

I am, GENTLEMEN,

Your very humble servant,

London,  
March 26, 1766.

AGRICOLA.

## NUMBER XXXVII.

*Inquiry relative to Dr. Hales's Machine for winnowing Corn.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

SOME years ago, in reading Dr. Hales's Treatise on Ventilators, I found a new method of winnowing wheat : which seemed so great an improvement upon all the other methods I had seen, or heard of, that I resolved to put it in practice, with all convenient speed.

I could easily have got the sieves, &c. executed in my neighbourhood : but, Dr. Hales gives no description of one necessary part of the *apparatus*, which he calls a circulating fan \*, or fagg ; from, I suppose, a presumption that

\* We cannot well understand from whence this gentleman's difficulty arises with respect to what Dr. Hales calls the *circulating fan*. He says, he understands it to be a common implement of husbandry, and we conceive the same indeed, to be so common, as to be the only one commonly used for winnowing corn. Dr. Hales calls it by a name, perhaps not so usual, but yet so descriptive, as not to be easily mistaken. As this instrument is a large

that it was a common implement of husbandry. This I have, nevertheless, not hitherto any where seen, nor can obtain any information of from my neighbours, or correspondents, or by means of any book of husbandry, though I have consulted most of those wrote in the English language. I, therefore, gave up all thoughts of the thing, until your work appeared ; in which I had some hopes of finding the matter occasionally mentioned. Failing in that, I resolved to ask the favour of you, to insert some description of the circulating fan, if not a plate.

Perhaps you may say, as in the case of Milesius, that you cannot afford plates of the common implements of husbandry ; and that so doing would not answer any good end. But, gentlemen, I beg you would consider duly, what may reasonably be called common implements in husbandry. I am sure, such as are not described in any book,

cylinder, to which are affixed several loose sheets of sacking, or coarse cloth, which, on turning the cylinder, do the office of a fan, or rather of so many winnowing fans. This being the case, it seems needless to give any detail description, and much less a plate of an implement, which may be seen every where amongst those common kinds, which all farmers must be possessed of. We might have been for this reason well excused from inserting F. C.'s letter, or giving any answer to it : but as it is an opportunity of imparting some very material information, not only to this correspondent, but also all our other readers, who are not particularly acquainted with what passes at the London Society for promoting arts, &c. we have thought fit to insert it. The information here meant, is what respects a very complete machine for winnowing corn, that is in the collection of the Society, and performs its office with great ease and dispatch ; not only separating the dust and chaff from all the corn, but also the light and bad corn from the sound. It takes up very little room, and is wrought with very little labour : effecting the intended purpose with great dispatch and convenience. This machine is made by ——— at Swillington in Yorkshire ; in which neighbourhood, as well as in several other parts of the north, it is much in use. Mr. ——— has also lately invented a *machine for thrashing corn*, which may be moved by the force of horses, or water, and dispatches very great quantities in a small space of time. It is now under consideration, in the Society for promoting arts, &c. E. O.

and



and may be confined in their use to a circuit of sixty or seventy miles, cannot be considered as such ; compared with the circulation of your work. And I am humbly of opinion, that a description of the less common implements of agriculture, especially when called for by your correspondents, would be greatly more useful to the public, and profitable to yourselves or booksellers, than the verbal altercations and scoldings of your correspondents, or the filling up your paper with Mr. Hall's old Essay, when an extract from Evelyn, Cook, or Miller, would have been of much greater significance to your readers. I hope, gentlemen, you will be pleased to forgive this trouble and freedom from

Your constant reader,

and sincere well-wisher to your work,

F. C.

*P. S.* You sometimes allow your correspondents to mention new treatises on agriculture. May I mention Mr. Dickson's treatise on that subject (of which a new edition, with additions and amendments, has been lately published) as, in my judgment, one of the best things that has been published upon ploughs—and ploughing, the most important operation in agriculture?

## NUMBER XXXVIII.

*Observations on the Culture of Burnet, and its Utility in feeding neat Cattle, Horses, and Sheep, demonstrated from facts: In a Letter from Christopher Baldwin Esq; to Dr. Templeman, Secretary of the Society for promoting Arts, &c. Published at the Desire of the Society.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

**T**HOUGH I was unwilling to have my name appear in a daily paper, yet I am very ready to authenticate \* the inclosed letter, in your very useful repository. I shall mow the four-acre field when in bloom for hay; and, if any thing further should occur in my experiments on burnet, I shall be very ready to communicate it to you, with the strictest impartiality.

I am, GENTLEMEN,

Clapham Common,  
April 12, 1766.

Your most humble servant,  
CHRISTOPHER BALDWIN.

\* We are greatly obliged to Mr. Baldwin for his interesting letter, and the honour he does us, in the liberty he allows of authenticating it, by his own proper name. We wish this example might be followed by other gentlemen of considerable fortune; and distinguished abilities in the study of agriculture. For though we think, it very proper to receive communications of anonymous correspondents, who favour us with them, if it be their pleasure to be concealed; yet, in important matters, especially where the facts are extraordinary, vouchers of known credit, certainly conduce to render the influence and effects of the accounts much greater. Moreover, the advantage we hope to procure to the public, by our work, is generally promoted by this means. For we are satisfied, that several gentlemen would, with more readiness, impart to us their observations, if the notion of singularity in sending their names did not in some degree prevent them: which difficulty would soon vanish, if gentlemen of Mr. Baldwin's pretensions, set the frequent example for a short time. A. T. E. R.

*A Letter*



*A Letter from Christopher Baldwin, Esq; to Dr. Templeman,  
Secretary to the Society for the Encouragement of Arts, &c.  
Published at the Request of the Society.*

**I**N compliance with the advice and desire of several gentlemen of my acquaintance, I have determined at last to send you the inclosed certificate of my burnet.

The fields contained by measurement seventeen acres, though I have only called the quantity sixteen acres, and I shall be well pleased to find myself excluded by more deserving claimants; for I thought that the Society proposed their premiums as a *stimulus* for the farmers; but a worthy member of your Society told me a few days ago, that they had little hopes of moving the mere Farmer to attempt experiments of this sort, but hoped, however, that gentlemen might be induced to do it from offered premiums of the Society, and that when they did, the neighbouring farmers, who could look over the hedge, would soon adopt in more general practice the experiments made by the gentlemen, when they saw the success that attended them.

Whether my friend's reasoning is right, or not, I cannot pretend to determine; however, I shall not content myself with merely sending you the inclosed certificate; on the contrary, I shall endeavour to give you such an account of the *culture* and *uses* of burnet, as, I believe, will give pleasure to the Society, if you think proper to lay it before them.

In the years 1763 and 1764, I made several experiments on burnet, with a view to make myself acquainted with its manner of vegetating, and the uses to which it might be applied: and having by this means acquired that knowledge I was desirous of attaining, I determined last year to lay down several acres with burnet; nor would I content myself with doing it in any *one* particular method: therefore, in the beginning of July, 1764, I sowed about eight rods of ground with five pounds of Rocque's burnet seed. Rain falling soon after the seed was sown, the plants came

up

up very finely, and throve in such a manner, that I was tempted to plough up about an acre of ground and plant it that autumn, in order to see what effect the winter would have on the young plants. Accordingly, on the fourth of October, I planted them in rows, about twenty inches apart, and about fifteen inches from each other in the rows. This distance, from experiments and observations which I have made, seems to me to be a very proper one. These plants took very well, and through the winter throve with surprising vigour. Last spring I ploughed the remainder of the field, being three acres, and planted it in the same manner with my plants, the whole of which, notwithstanding the \* uncommon drought of last summer, grew well, and the verdure of the plants was really very beautiful. No water was used; indeed it would have been a vast work in a field of that size: however, I never saw any need of it. The plants were once hoed, and stood over for seed, of which the quantity collected was not very great; but this must be attributed to the uncommon drought, for I think we had not above one shower of rain from the planting to the gathering of the seed, the whole of which amounted to about one hundred and sixty pounds.

The seed being got, I was impatient to see how the cattle would take to it, as it was roundly asserted by some gentlemen, that *no cattle* would eat it. Accordingly I ordered four cows and two horses to be turned into the field; the cows fed freely upon it, but the horses did not seem to like it so much at first, though in two or three days they

\* This fact of burnet's thriving well after transplantation, without rain or manual watering, is very extraordinary, and demonstrates the great utility this plant may be of in dry soils, where scarcely any kind of grass, or substitute for it, can be made to thrive. If we take this into consideration, along with another circumstance, which is, that it will grow in poor, as well as dry land, we must allow that it promises extremely great advantages. In order to ascertain the degree of this property of growing on poor land, the Society for promoting arts, have this year renewed their premiums, but confined very judiciously, to such as is cultivated in the worst reputed land, in each respective neighbourhood. R.



fed well upon it. Burnet has strongly the taste of cucumber, and I was fearful it might give a disagreeable taste to the milk; it therefore gave me great pleasure to find, in about four or five days, that the quantity of milk was not only much encreased, but the flavour of the cream much superior to any I had ever had before, or ever tasted from cows fed upon the richest meadows. The cows and horses having fed down the field, it was hoed again, and then harrowed once over: which laid it very clean: nor could I find, that the burnet was at all hurt by the harrows.

Here let me observe to you, that I fed my horses in the stable for about five weeks with the burnet straw, or rather haulm, from which the seed had been thrashed. These horses fed very freely, and throve much upon it, though they had only half their usual allowance of oats. However, as I would by no means suppress any circumstance that may appear unfavourable to burnet, so I must tell you, that I observed, when any friend called upon me, and their horses were put into the stable, some of them eat very greedily of it, and others \* would not touch it. I cannot say this gave me much concern. I satisfied myself with thinking, that some horses did not know what was

\* This agrees with what, we have observed above, in the notes on the Kentishman's letter in this number, page 240, that horses are less generally disposed to eat burnet, than neat cattle: and, consequently, that in those places where the peculiarity of the soil, renders the burnet less agreeable to beasts in general, it is not to be wondered at horses shew a more extraordinary aversion. That there are such places, where the burnet is disagreeable in different degrees to beasts, is evident from unquestionable facts, and to what principle of difference it is owing, is extremely well worth inquiry. We should be obliged, therefore, to gentlemen, to whom instances of the disrelish of beasts to burnet may occur in any singular manner, to communicate their observations to us, as well with respect to the state and appearances of the burnet itself, as the nature, qualities, and appearances of the land on which it grew, in order to ascertain, if possible, the cause of this difference, that, either a remedy for it may be attempted, or at least the public may be furnished with the means of distinguishing, in what places the cultivation of this plant would not be profitable. A. O.

good for them ; or, to speak more seriously, I thought the novelty of the food might as much displease one horse as it pleased another ; and Dr. Templeman knows, that there are some things which we loath as children, we are fond of as men ; and that there are some things which we as much dislike as men that are very wholesome food. But to come nearer to the point ; it is well known some sheep and cows will not touch a turnep : yet is any one weak enough to infer from thence, that turneps are an unwholesome or improper food for cattle ? and I was lately told, by a particular friend, that he had often observed, when his horses had fed for some time on saintfoin hay, it was some days before they would again take to meadow hay.—I should not have mentioned this circumstance of the horses, but to shew my impartiality ; and I do it the more readily, as I find there are some gentlemen who are as fond of decrying, as others can be of promoting, useful experiments in agriculture.

Being well pleased with the success that had attended my first experiment in this field, which I call four acres, I determined to proceed as I had intended in the spring of the year. Accordingly, as soon as the oats were got off a field of twelve acres, I ordered it to be ploughed and sown with one hundred and sixty pounds of burnet-seed before mentioned. This field was sown the twenty-sixth of August last ; and no rain falling till the eighteenth of September, the plants did not appear till the twenty-eighth of that month. However, there seems to be a good crop : and I intend, as soon as they fresh up in the spring, to have the plants set out with small hoes (such as are used for carrots and onions) to about six inches apart : and in about a week after this is done, I shall harrow it with light harrows. For from experiments which I have made, this seems to me to be the best method of managing broad-cast burnet. Having nothing farther to say in regard to this twelve acres, I must return to the four-acre field transplanted, which having been hoed and harrowed, as before mentioned, was laid up for winter-feed for my cows : but finding lately some gentle-



gentlemen had again asserted, that sheep in particular would sooner feed on the quick-hedges than touch the burnet, I sent to a neighbouring farmer for his flock of sheep, and having a friend with me, we followed the sheep into the field, who fell upon the burnet so greedily, that we found it very necessary to send them home again.

Being much vexed at these idle tales told about so much to the prejudice of this (as it appears to me) excellent plant, I determined to put it to as fair a trial as I possibly could. Accordingly, I ordered in four cows, which were in very good feed on natural grass, and had besides a large truss of oat-straw put in their cribs every night, notwithstanding which they gave very little milk, and indeed, were almost dry. These cows, I declare, had not been in the burnet above six days, before they gave much more than double the quantity of milk, nay, was *L* to say three times the quantity, I know, I should not exceed the truth. The milk is exceeding fine, and free from all bad taste; and farther I must observe, that they soon began to leave half their straw in the cribs; so that they are now served with only half the quantity they had before. My land is poor dry up-land gravel, there are millions of acres in this kingdom of better land that do not fetch two shillings and sixpence an acre. What a scope therefore is here for improvement! nay, I cannot but observe with amazement, the great numbers of country gentlemen who daily flock to this great city in pursuit of trifles, when they have such inexhaustible funds of knowledge within themselves, if they would properly make use of them.

As the account I have now given you of my burnet, may appear a little extraordinary to some of the worthy members of your Society, so I shall be far from being displeased at their even doubting what I have now said. On the contrary, it will give me pleasure, provided any gentleman, who has such doubts, will do me the favour to call at my house, and convince himself by ocular demonstration of what I have now said. I am, GENTLEMEN,

Clapham Common, Your most obedient humble servant,

Jan. 6.

CHRISTOPHER BALDWIN.

M m 2

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## NUMBER XXXIX.

*Observations on a common Error, or Collusion, practised with respect to the Form of Measures, by which Corn, Coals, &c. are sold, to the Detriment of the retail Purchasers of those Commodities; with a Proposal for preventing it, by providing a just Standard of Regulations, proper to be enforced, as to the relative Dimensions of the Diameter and Depth of such Measures.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

**I** Some time ago, met, by accident in travelling, with an ingenious gentleman, who furnished me with the hints of the observations I have here sent you, on what may sometimes be an error; but I am afraid more frequently a fraud, in the construction of measures of that kind, where heap, and not strike measure, is the custom. I was much affected with the subject of them: and thought it a great matter of regret, that no remedy should be applied to a public evil so generally practised, as the delusive form of these measures; and, at the same time, as I apprehended, so easily to be reformed by the same interposition of the authority of the magistrates, as is exerted in other similar cases: I mean, reformed to a certain material degree; because, tho' the present execution of the laws, respecting false weights and measures, does not absolutely prevent all frauds of that kind; yet it keeps them greatly under. Sensible, that in general, according to the common proverb, what is every body's business is nobody's; and that this enormity must prevail always, if no beginning of an attempt be made by some private person to bring about this reformation, I was desirous myself to endeavour to excite the public attention to the redress of it; and either to procure the execution of some law already subsisting that would reach this transgression, if such law there be; or the institution  
of



of some new one, that would specially and adequately make a due provision against it. But, on reflexion, I found somewhat was previously necessary to be done, in order to enable those, before whom this matter might come, either in a legislative or judicative light, to enact or decide equally and equitably as to particular cases. For, though the fraud is obvious, when in the extreme, even to the observation of the senses; yet, when in a less flagrant degree, a difficulty would arise, of the proper limits to be set, in order to determine what is precisely right, and what is criminally wrong. This consideration evidently indicated, that there was wanting some standard, which might be applicable to every case; and become the guide, as well of the makers or users of the measures, as of those who were to settle or judge of the fairness of them. The means of establishing a proper standard for this purpose, seemed to be the forming a plan of proportions of the respective width and depth of the measures, of each denomination, founded on that of some known measure, and established by law for the same uses. In consequence of this apprehension, I published a letter in the St. James's Chronicle, to try by that means to obtain such a plan of proportions adjusted by the Winchester measure and coal bushel, both which are settled by acts of parliament, from the ingenious person above mentioned, whom I believed, by the manner he explained himself in our conversation on this topic, to be very capable of supplying me with it; or, if he should not chuse the task, from any other public-spirited person, qualified to gratify me in this point. The letter was as follows:

“ There are thousands of poor families in and about London, and other large towns, that buy their coals and other necessaries in no larger quantities than by the bushel, half-bushel, peck, half-peck, &c. yet tho' these several measures, upon a nice enquiry, may each hold their proper quantity, in strike measure; yet if the depth and diameter be not properly regulated, the purchaser may be, and nine times in ten

is,

is, greatly injured thereby, in all commodities where the goods, whether coals, roots, shell-fish, fruit, or whatever commodity sold, is to be heaped, or crowned above the measure. For instance: Suppose one bushel to be made eighteen inches and an half diameter, and eight inches deep, which is the dimensions of the lawful Winchester bushel; and another of fifteen inches diameter, and about twelve inches deep; two bushels thus made may, for ought I know, contain exactly the same quantity struck measure; but certainly he, who purchases crowned, or heaped measure, will be a great sufferer, if he be served from the bushel of fifteen inches diameter; and so in proportion to all smaller measures, as it is clear more coals, fruit, &c. will lie on a space of eighteen inches and a half diameter, than on fifteen.

“Trifling as this matter may seem at first view, it is of some importance, and I could wish some person, who is able to improve the hint, would ascertain the proper depth, diameter, &c. of all measures, from the bushel to the pint, so as to make them similar in shape, and proportionable to the lawful Winchester, and coal bushels, which might be done by a copper-plate and a few observations. This plate might, as it ought, be hung in some public place in every town in England, for the information of the poor, and the justification of the magistrates to punish those who presumed to sell by measures of any other construction.

“I am willing to believe that many people are innocently guilty of this fraud; and I am not without hopes, that a most ingenious fellow traveller, who furnished me with the above hints, will be as willing as he is able, to state the matter accurately by an explanatory copper-plate, should this, my only method of addressing him, come to his sight.”

The result of this letter was, that the gentleman above mentioned, did readily favour the public and me, with undertaking to make the desired plan of proportions; and has ordered it to be engraved on a copper-plate, in order to its being published. To render the benefit of it more extensive, and to reimburse him in the expence of engraving, &c.

I think



I think it would be very proper a subscription should be set on foot, and I have desired him in that view to leave the plate with Mr. Davis, bookseller, the corner of Sackville-street, in Piccadilly, who will receive the names of such gentlemen as are desirous of subscribing, and when printed off, deliver the prints on the payment of half a crown. I wish, in order to promote this matter, you would insert this, and the former letter before published in the St. James's Chronicle, in your *Museum Rusticum*; as it will then be perused by many who have it in their power to make a due use of it; and the memory of this matter preserved for some proper future occasion, if it should accidentally meet with neglect now. As this is very consistent with your work, I make no doubt but you will readily give it a place; and, in so doing, I think you will serve the public, and I am sure you will oblige me, who am,

GENTLEMEN,

Yours, &c. &c.

A PLEBEIAN.

P. S. Since I wrote the above, I have seen, at Mr. Davis's, Bookseller, in Sackville-street, the engraver's copy, of the plate now engraving, of the plan of the proportions of the measures, with explanatory notes, &c. What, moreover, gave me an additional pleasure in the information I then gained, was, that I find my fellow traveller has been prevailed upon to publish this plate with his name, by which the public as well as myself (and the poor in particular) may know to whom they are indebted for this one instance at least, "That all men's heads, which are clear, are not without hearts that feel for the woes of others." The person, I mean, who is the worthy designer of this plan, is, Griffith Davies, Esq; collector of the customs at Harwich; and the constructor, of those commodious salt-water baths, at that town: to which (according to Dr. Lucas's account) none can be compared; and by whose ingenuity and public spirit, even the town of Harwich itself has, within a few years, been so improved, that  
from

from being merely a place of passage, it is now become the resort of many people, every summer, of the first rank and distinction.

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## NUMBER XL.

*A Letter from Mr. Wynne Baker, respecting some Inquiries relative to Rape-seed, Cole-seed, and Millet; and a Proposal for establishing a general Correspondence betwixt the several Societies for promoting Agriculture, for the transmitting to each other useful and rare Seeds and Plants.*

*To the Editors of the MUSEUM RUSTICUM,*

GENTLEMEN,

**I** Received the inclosed letter yesterday. In a letter of mine to you, on the 7th of May, 1765, I inclosed you a letter from the same gentleman, which you were so kind as to insert in your 4th vol. p. 397. I then informed you, he is a person of consideration in this country, and a constant reader of your work. I may now add, that his constant attention to the service of his country, (in which he pays no small regard to agriculture,) both in his public and private character, procures him the steady affection of the people: and therefore I wish some of your kind correspondents would answer his enquiries, which I should esteem a favour done to me; and, for that purpose, you will oblige me, by inserting his letter in your collection as soon as may be convenient to you.

Your correspondent G. B. in his P. S. p. 157, Vol. V. has promised to give us “ a \* full account of the feeding  
“ beasts

\* Application has been made by us to a gentleman, who has very great concerns in the making linseed and rape oil; and is, at the same time, an able farmer; to give us the most satisfactory account of the best manner, and the effects of feeding cattle with the cakes of the linseed. In compliance with Mr. Baker's request,  
we



"beasts with linseed cakes." I presume rape cakes are also used in the same way? I shall be very thankful to this gentleman, if he will indulge us with this account as soon as he conveniently can.

I have, gentlemen, taken some pains in trying to procure a little millet, in order to sow in this country; as I do apprehend, if the culture of it could be generally introduced, it would be a great relief to the poor; but all my endeavours have hitherto proved ineffectual. In your 5th vol. p. 74. I find a letter from Mr. Burton, upon the subject of African millet, abstracted from the transactions of the Berne Society.

The world is already much indebted to some ingenious gentlemen farmers of Switzerland, for their unwearied pursuits of agriculture; and I could not but feel myself obliged to Mr. Burton, for furnishing us with so useful an hint, from such authority. It has raised in me, a great desire to obtain some of this African millet, as well as the other sorts, particularly the yellow; as that, which is sold by the grocers, will not grow. If you, or any of your correspondents, can assist \* me in this particular, I shall most chearfully make full recompence, over and above the acknowledging myself much obliged. I am strongly per-

we shall press him for a speedy performance of his promise; and will insert it, the first opportunity after we receive it. In the mean time, we can inform Mr. Baker, that cattle are not fed with rape cakes, because they refuse to eat them: and those cakes are therefore sold for manuring the ground. This is true of the rape cakes in general, but I have heard it asserted, that in Lincolnshire the cattle have eaten them. This difference may be owing to the difference of the cakes; because both cole-feed and rape-feed being used for extracting the oil, it is possible the general disgust may be only to one: and that the other, when wholly free from it, may be liked by some cattle; and, as they are frequently mixt, this may account for the seeming contradiction. E. O.

\* We shall, with great readiness, endeavour to procure what Mr. Baker desires; as well on his own account, as to promote a very laudable examination into a subject of great importance; as we must esteem every attempt to relieve the wants of the poor of any country, by the discovery of cheap provisions. R.

suaded, that millet would answer wonderfully well in the drill culture.

I have long intended, gentlemen, by the channel of your work, to propose a scheme to the public, for a mutual intercourse and correspondence between the nations, which now seem engaged in the cause of agriculture, for the transporting to each other, the seeds of such scarce and valuable plants as are, or might be, discovered: by which means, the \* *Museum Rusticum* would become a general channel of intelligence; and the useful seeds and grain would be much sooner transported from nation to nation, than they can be by the endeavours of a few individuals who labour these points. And I should conceive, the most effectual way of accomplishing a scheme of this kind, would be for the societies now established in many nations for promoting agriculture, to be the repositories for such grain and seeds. I am persuaded every society, now established, would cheerfully contribute their aid; and I can almost take upon me to say for that of Dublin, that they will lend their's in so good a work: as their principles of motion, are not actuated by national views; but the general good of mankind is the life and spring of their actions. I have not yet had time to digest and lay this scheme before them, but I will prepare it as soon as I can. In the mean time, if I find this loose hint shall meet with the approbation of you and your correspondents, I shall draw out a list of such articles as I believe would be useful, but have not yet been able to obtain, altho' I am continually procuring letters to be sent

\* Whenever Mr. Baker will favour us with the particulars of his plan, we shall be extremely ready by all means, that come within the intention of our concern in this work, to promote it to the utmost of our abilities. We are extremely sensible, that such an intercourse, not only betwixt the societies for the promoting agriculture in Europe, but between them and those in America, of which there are now several; would have a great tendency to the introduction of many great improvements. But how far such an establishment may be practicable, we shall suspend our opinion, till Mr. Baker has more explicitly opened his notions to us, to which we shall give great attention. R.

to



to many parts of the world. Objects, which appear to be inferior to those which engaged the attention of mariners and merchants, are generally neglected; and when a ship returns, it is the easiest thing imaginable for a man to say, I forgot it, I lost it, or it could not be had. I am tired out with these excuses, and am losing one year after another, without any prospect of success. And therefore, in the name of the public, I now call upon you, and your kind correspondents, to lend your aid, in rousing mankind to an attention to this object, which I really think an important one.

I am, GENTLEMEN,

Your most obedient humble servant,

Dublin,  
March 30, 1766.

JOHN-WYNNE BAKER.

DEAR SIR,

A MODERN writer upon husbandry in this kingdom, I mean the ingenious Mr. Charles Varley, has pointed out a distinction between cole-seed and rape-seed, which, I confess, I had never before been informed of.

The cole-seed, according to him, is a \* species of cabbage, brought originally from Holland, and, in a proper soil, is productive of more seed than the rape. The rape plant, in my apprehension, is a species of wild turnep, and, therefore, differs extremely from the other. I have met

\* Mr. Varley is certainly right in asserting, that the cole-seed and rape-seed, are very distinct species of plants; and that, the cole-seed is of the cabbage tribe. It is equally true, that the rape is a wild turnep, and that they have no affinity, but what is general to those two families of plants. The cole-seed is of much later introduction here, and most probably was brought first from Holland or Flanders, where it has been long cultivated for making oil: though it is, most likely, a native species of the more eastern parts of Germany, where several others, of a similar kind, are found. R.

with a third sort of seed-bearing plant, nearly allied to these kinds; which is common in Burgundy, and some parts of Flanders. The people there call it, I think, *navette*, and assert, that it produces more seed, and an oil so far superior to rape oil, as to be often eaten instead of olive oil. A gentleman of my acquaintance has brought some of this last seed into this kingdom, and it thrives exceedingly well with him.

Mr. Varley says, that the fenny countries of Lincolnshire, Yorkshire, &c. are the most famous places for cole-seed and rape-seed: it would be a service to the public, if some gentlemen of those counties, would explain particularly the difference between these kind of plants, and which of them may be most \* advantageous for the farmer.

Such a person, perhaps, might be also induced to set out particularly the † uses, to which the rape-oil cakes are applied for the feeding of cattle: an information which, I solicited, though hitherto in vain, in the *Museum Rusticum* of Volume IV. page 397.

I have also reason to apprehend, that, since a scarcity of corn has prevailed in this kingdom, some distillers have been induced to draw a spirit from these rape-cakes, and have found it turn out very much to their advantage. This  
at

\* There are two kinds of turneps, according to the older notions of distinction, the *Rapa* and the *Napus*: and there are wild species of both kinds. The common rape-seed, is a wild species of the second kind, called in authors *Bunias*, and *Napus sylvestris*, or *wild navew*; which affords a sweeter oil, than either the wild rape, or the cole-seed. This is the true *navette*: but Lemery says, that the seed of the *colsa*, or cole-seed, is the kind, commonly called *navette*, by those who use it for making oil. We are apt to believe, therefore, the supposed third kind, which this gentleman says, has been lately shewn, and newly introduced, is, in fact, the cole-seed: and, that the other kinds, if he had seen two, before in Ireland, were the wild rape, or charlock, and wild navew, or burnias, which have both been used for making oil; and are frequently confounded under the name of rape-seed. E.

† The cole-seed, is cultivated in some of the places, mentioned by this gentleman, for two very different purposes, the  
ma-



at least is a matter, that deserves the attention, and investigation of the learned.

I know an ingenious poor man in my neighbourhood, who has invented a method of refining these oils, at the most trifling expence, so as to make them answer for all the purposes of the woollen manufacture, equally to the best imported olive-oil. I believe the public might for a trifle purchase this secret from him; and I have no doubt, it would be of national advantage, to have it universally communicated. So far as you think these hints may be properly inserted in the *Museum Rusticum*, I beg you will communicate them to the proprietors of that work.

I am, S I R,

Friday Morning,  
March 28, 1766.

Your most faithful,  
and obedient humble servant.

making oil, and feeding cattle only. But originally it was introduced there, probably, in imitation of a Dutch and Flemish practice, for making oil only: and was sown in common with rape-seed, or, more properly, wild navew-seed, when there was danger of a bad season, that might make the rape fail. For, being extremely hardy, the cole-seed would resist weather, destructive to the other.

This hardiness recommended it to the attention of the farmers: who finding it a good security against want in hard winters, where other pasturage might fail, and fodder be very dear, they cultivated it for solely feeding cattle: and this practice has now spread over several counties. It is our intention, when we are furnished with the information mentioned above in the note on Mr. Baker's letter, to give a full account of the culture, and particular uses, of the cole-seed for both these purposes. But we apprehend the cole-seed, is so much of the nature of bore-cole, that the manner of cultivation must be greatly the same: and that the knowledge of the comparative advantages is more a point to be inquired into, than how they may be differently managed. E. O.

## NUMBER XLI.

*Some Observations on the Point of View to which the Editors have reduced their Inquiry into the Reason of the Liking or Disgust which Cattle shew to Burnet : with an Account of an Experiment relative to the same : and some Reflexions on the Mischief done by Labourers carrying up Ladders Materials for Building, and a Proposal for applying an adequate Remedy.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

**I** Heartily assent to, and approve, your reducing the point of inquiry, now remaining, about Mr. Rocque's burnet to this, viz. in what soils it can be *advantageously* cultivated? " For as it is (to use your own words) beyond all doubt, at " present, that there are instances of particular places, " where the beasts obstinately refuse to eat burnet, and " of others, where, though they do not *wholly* reject it, " they yet shew they have some dislike to it ;" so, I have always had more candour than to doubt, that there are places where beasts not only *eat*, but like it.

Again, you most justly assert, that this liking and disliking cannot be owing to a mixture of Mr. Rocque's original seeds ; for though there might be a *seminal variety*, yet, " it being *certain* that the cattle fed promiscuously on " what Mr. Rocque raised from this seed, and that where " parcels of it have been divided and sown in different " places, the cattle eat what was raised in one of these " places, and refused what was raised in others ; it can be " ascribed only to the *effects* which different soils have on " this plant." See note \*, p. 27 of present vol.

This judicious ground-work of yours, gentlemen, is sufficient to answer fully the *hypothesis* advanced by several, to account for the dislike which surprized many of us.



*Mago* need no longer insist on the supposition, that fig. 2, and 3. in Plate 1. of your Vol. V. represent two sorts of Mr. *Rocque's* burnet; and that fig. 2. is the *green* or *most-grassy*, and fig. 3. the *most-stalky*, as he expresses himself, p. 30 of this volume: for you have shewn him, that cattle eat promiscuously what Mr. *Rocque* raised; and, as to his inclination to think, that I shall find, that what is called my burnet, is the same as fig. 2. if he will please to look upon the specimen I sent you, his eyes will convince him, that he has no sort of grounds for it.

In agreement, gentlemen, with the important point, to which you have judiciously reduced our inquiries about burnet; I propose to give you an account, with my first leisure, how burnet, which grows on a rich flower border, is relished by cattle. Mr. *Cooke's* soil is a *coldish*, and lightish gravel, and mine a warm gravel mixed with loam; and from neither of these has a burnet arose, which our cattle would eat.

Fully persuaded, gentlemen, that you had reduced the inquiry, as to the liking or disgust of cattle to burnet, to the right point, I set about the experiment this morning, which, I supposed, would confirm your theory. Having a little burnet raised from the second generation from Mr. *Rocque's* seed, and growing in a *rich garden* border for flowers, I apprehended it might be more agreeable, on account of the soil, to cattle, than what had grown on a warm gravel mixed with loam. I accordingly gathered a good handful, and washed it well in fair water, that no accidental impurity might disgust the beast to which I proposed to give it.

As the garden-gate was fast, I gave it over the wall to my gardener, on whose integrity I could depend, and bade him carry it to a cow in the house, which was there, and on whom I had not made the experiment in summer, because she was in a publick pasture. He soon returned, and told me, that she *eat*, and seemed to *like* it much. I now concluded, (as I suppose you would,) that the different goût with which my burnet had been received, proceeded from some different qualities in the soil. I resolved, however,

ever, to gather some of the burnet which I raised on the gravel last summer, and try the experiment on the same cow with it myself. I did so, and found that the cow eat it as greedily as my gardener assured me, she had eaten the other. I now began to think, that the different reception of my burnet proceeded from the difference of the seasons; and, that either the winter frosts had *mellowed* those acrid salts, which seem to occasion the dislike; or, that the less quantity of juices, which the earth may give the roots in winter, made this grass more palatable. I resolved, however, to make one trial more; and accordingly gathered in my handkerchief a pretty large quantity of the burnet growing on gravel; and found that the cow seemed to devour it with great greediness, even greater than before; and I could scarce save my handkerchief from her. I had, however, my *new* experiment to make, which was, to offer part of it to the cow in the next stall, the only one I had in the house of those which refused it in summer. I own, I was fully persuaded she would eat it *greedily*, because she will eat almost any thing; having been used to weeds of almost all sorts with her former master. I was then, gentlemen, full as much surprized to find her reject it with all possible marks of dislike, as I had been to find the other greedily devour it.

It now remained only to try her with the burnet growing on the garden soil; and this she rejected, as she had done the other, as soon as she smelled to it.—*N.B.* The cow which rejected the burnet, is the dam of her which liked it.

Must we not, gentlemen, from these instances, be inclined to ascribe the liking or disliking of burnet to the *idiosyncrasy* (as the physicians speak) or *peculiar constitution* \* and *palate* of the cattle?

An

\* We have not resolved the whole of the difference of cattle, with respect to their liking or disliking burnet into the difference of soil, but into that, and the natural caprice or humour, that is found in them, operating together: where a few only, among



An account which I lately read in one of the public papers of the death of a labourer, who, in attending the masons, fell from the ladder, and left a *large* but *helpless* family, revived in my mind, reflexions on the possibility of avoiding many casualties of this sort, and saving much time and labour, by the use of a crane properly disposed. Every body knows how much time and labour is spent in the carrying some of the materials with which carpenters, and almost all those with which masons work, by persons up ladders, and in the person's return down again. Every one also knows, how many casualties happen, not only to the persons carrying up such materials, but to the persons who pass by in towns where such work is carried on, by the accidental fall of part of the materials from the head of the labourer. One would think it so easy to remedy these

among a great number, refuse the burnet, the difference of soil alone cannot be alledged as the sole cause : because it must, in such case, equally affect the whole. Where, on the contrary, the whole of a great number agree in such refusal, it cannot be the effect of any peculiar caprice or humour, because that would hold good only of a few among the number. So that this difference in them is obviously the effect of two conjoint causes : which reciprocally corroborate each other in particular cases. For the particular disposition of the beast is aggravated by that quality of the burnet, received from the soil, which tends to make it generally disgusting ; and renders the effects observable, where they otherwise would not be so ; and particularly in the case of horses, who are less apt to be fond of burnet than horned cattle are.

We do not conceive the difference of soil, that renders burnet acceptable or disagreeable to beasts, lies in the richness or poorness of the soil, or its texture : but, probably, in the presence or privation of some particular mineral or fossile body, impregnating the plant, and rendering it disgusting. Possibly it may be some small proportion of iron, more than is common to earth in general, and yet not enough to mark the ground with any peculiar appearance. It is well known, that where iron abounds in a vitriolic state, cattle shew a great abhorrence to the vegetables : and it is a reasonable supposition, that burnet may either have a greater disposition to take up iron, than plants commonly have, or that a smaller quantity may have an effect on its flavour. To some such circumstance, it is highly probable this mystery is owing : and the examination into the respective facts in this view will probably unravel it to us. E. O.

inconveniencies by the help of that simple and well-known instrument, a crane, that it is really amazing, that nobody should have used it on these occasions ; and that it should not have come into general use.

I apprehend, gentlemen, that the neglect of this engine, on such occasions, has arisen from the apprehension, that it would not be easy to fix a crane for the purpose, or to bring it into use when fixed. But a little reflection may convince *any* one, that these seeming inconveniencies may be obviated very easily. For, in many cases, the crane may be fixed by a proper claw, and the pin to a spar or rib, or other part of the roof, while it remains uncovered ; and when the roof is covering or covered, so that the crane cannot be fixed to these, a pole of sufficient strength may be fixed in the ground, at a convenient distance from the wall ; and the top of this, being bored to the dimensions of the crane's neck, or rather the under-part of it, that may be let into, and turn in it. And as to the bringing the crane to a convenient place for unloading, the neck of it may be passed through with cross spikes at right angles ; so that when the barrel, or bucket, or tub, or whatever vessel is used to hold the materials, comes to a proper height, the workman on the top may draw the crane, and consequently vessel, by the first or second spike, until it be brought to a situation most convenient for unloading, and may unload, and then return it to its former position. It would be adviseable to have a couple of pullies, properly guarded, fixed on the highest part of the crane's neck, which would facilitate the ascent of the materials ; and to have a loop at the end of the rope, by which it ascends, and an iron crook, to secure the weight while the basket is unloading.

If my meaning is not sufficiently understood by this general description with my pen, I shall willingly improve it by the sketch of my pencil.

As I consider the *Museum Rusticum*, &c. as the best ; nay, in a manner, the only channel of information, and communication betwixt the distant friends of agriculture, who are not known to each other, I am always glad to hear



hear of its extensive reception ; and hope you will do all in your power to keep up its credit.

I congratulate, therefore, not only you, but the public, on that honourable reception, which, I am well assured, your work meets with in Denmark. I am informed by an authority, which (I think) cannot be disputed, that the *Museum Rusticum* is regularly transmitted to, and diligently perused by that great ornament of, and friend to all literature, the prime minister of Denmark, Baron *Bernsdorff*.

Last summer, he commissioned into *England* a gentleman of sense and learning, a doctor of physick, educated at the university of *Halle*, to view the various soils, and methods of improving land in *this* kingdom. I saw the heads of his inquiries, signed by the baron ; and was assured, by the gentleman, that most of them had reference to the *Museum Rusticum*.

\* That you may never forfeit a right to such an honour, in foreign countries, is the sincere wish of,

GENTLEMEN,

Your humble servant,

East-Newton,  
March 13, 1766.

THOMAS COMBER.

\* We are much obliged to Mr. Comber, for the great regard he appears on all occasions to shew for the *Museum Rusticum* ; and for his disinterested and public-spirited endeavours to support it by a constant supply of matter. We say *disinterested* ; because mistakes have been propagated, that he had some concern in the publication of the work, from the assiduity he has shewn in his correspondence. But we declare, that he is not personally known to, or has any other than a general correspondence, such as appears in his letters, with any of the editors. E. O.

## NUMBER XLII.

*A comparative Calculation of Expence and Profit between the Drill and the Common Husbandry, taken from Mr. Baker's Report to the Dublin Society of his Experiments in Agriculture, for the Year 1765. Published by Order of the Society.*

An estimate of the expence upon a plantation acre of wheat, in the common husbandry.

|                                                                                                                                                             | <i>l.</i> | <i>s.</i> | <i>d.</i> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------|-----------|
| <b>T</b> O the first plowing, commonly called breaking, for fallow, 8 horses 8 <i>s.</i> 2 plow-men 1 <i>s.</i> 4 <i>d.</i> 2 drivers 1 <i>s.</i> - - - - - | 0         | 10        | 4         |
| To the first harrowing, 4 horses 4 <i>s.</i> a driver 6 <i>d.</i>                                                                                           | 0         | 4         | 6         |
| To the second plowing, commonly called gau-rowing - - - - -                                                                                                 | 0         | 10        | 4         |
| To the second harrowing - - - - -                                                                                                                           | 0         | 4         | 6         |
| To the third plowing, commonly called stretch-ing - - - - -                                                                                                 | 0         | 10        | 4         |
| To sowing the seed, 8 horses 8 <i>s.</i> 2 plow-men 1 <i>s.</i> 4 <i>d.</i> 2 drivers 1 <i>s.</i> the seed-man 8 <i>d.</i> -                                | 0         | 11        | 0         |
| To seed wheat, one barrel - - - - -                                                                                                                         | 1         | 0         | 0         |
| To rent for the year of fallow - - - - -                                                                                                                    | 0         | 18        | 0         |
| To ditto, the year the crop is growing - - -                                                                                                                | 0         | 18        | 0         |
|                                                                                                                                                             | <hr/>     |           |           |
|                                                                                                                                                             | 5         | 7         | 0         |

In this account 40 *s.* are charged for 40 horses, employed in the culture of one acre for wheat, in the common husbandry; a charge which ought to be considered by the farmer, for he actually buys and maintains his horses for this business.

The crop which follows wheat is generally oats; but sometimes peas are sown instead of oats; with some, the practice is to let the peas follow oats, in which case they fallow only every fourth year; but where land receives no other assistance than what arises from fallow, it is a bad practice



practice not to fallow every third year. It is the general practice to plow but once for oats, and therefore it shall be stated so; but it is a much better practice to plow the wheat stubble once before winter, and again in the spring.

An estimate of expence upon an acre of oats.

|                                            | <i>l.</i> | <i>s.</i> | <i>d.</i> |
|--------------------------------------------|-----------|-----------|-----------|
| To plowing once - - - - -                  | 0         | 10        | 4         |
| To seed oats, 2 barrels - - - - -          | 0         | 12        | 0         |
| To harrowing 4 s. 6 d. feed-man 4 d. - - - | 0         | 4         | 10        |
| To one year's rent - - - - -               | 0         | 18        | 0         |
|                                            | <hr/>     |           |           |
|                                            | 2         | 5         | 2         |
|                                            | <hr/>     |           |           |

These two crops consume three years; after which the farmer is to begin again, and to incur every article of expence stated in the above accounts, in order to obtain two crops more.

An estimate of expence upon a plantation acre of wheat in the drill husbandry, the first year.

|                                                                     | <i>l.</i> | <i>s.</i> | <i>d.</i> |
|---------------------------------------------------------------------|-----------|-----------|-----------|
| To plowing 4 times, to prepare the fallow -                         | 2         | 1         | 4         |
| [This is the same charge as in preparing for the common husbandry.] |           |           |           |
| To harrowing twice for ditto - - - - -                              | 0         | 9         | 0         |
| [This is the same also.]                                            |           |           |           |
| To rent for the year of fallow - - - - -                            | 0         | 18        | 0         |
| [This charge is saved after the first year.]                        |           |           |           |
| To harrowing with the drill harrows - - -                           | 0         | 0         | 6½        |
| [Four acres a day may be harrowed with one horse.]                  |           |           |           |
| To sowing with the drill plow - - - - -                             | 0         | 1         | 1         |
| [From 3 to 5 acres may be sown in a day.]                           |           |           |           |
| To seed-wheat, generally 5 stone, but suppose 6                     | 0         | 6         | 0         |
| To the first, or winter hoeing - - - - -                            | 0         | 1         | 7         |
|                                                                     | <hr/>     |           |           |
| Carried over                                                        | 3         | 17        | 6½        |

|                                                                                                                                                      | <i>l.</i> | <i>s.</i> | <i>d.</i> |
|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------|-----------|
| Brought over                                                                                                                                         | 3         | 17        | 6½        |
| [Two acres may be hoed in a day, two horses, plow-man and driver: the design of this hoeing is to leave the plants dry, and to meliorate the earth.] |           |           |           |
| To the spring hoeing with the cultivator                                                                                                             | -         | 0         | 1 1       |
| [To deepen the soil, one horse, plow-man and driver.]                                                                                                |           |           |           |
| To the 3d hoeing, <i>i. e.</i> to return the meliorated earth to the corn                                                                            | -         | 0         | 1 7       |
| [To make the corn tiller, <i>i. e.</i> to encrease its branches.]                                                                                    |           |           |           |
| To the fourth and final hoeing                                                                                                                       | -         | 0         | 1 1       |
| [To fill the grain and render it large.]                                                                                                             |           |           |           |
| To rent, the year the corn is growing                                                                                                                | -         | 0         | 18 0      |
|                                                                                                                                                      |           | <hr/>     | <hr/>     |
|                                                                                                                                                      |           | 4         | 19 3½     |

✎ *N. B.* Although the drill culture for the first year is very near as expensive as the common, yet, after taking the first crop, the expence and labour of fallow, and loss of time, is not to be incurred again, as is unavoidable in the common husbandry.

An estimate of expence upon an acre of drilled wheat, after the first crop.

|                                              | <i>l.</i> | <i>s.</i> | <i>d.</i> |
|----------------------------------------------|-----------|-----------|-----------|
| To plowing the land once                     | -         | 0         | 10 4      |
| [One plowing is all that is necessary.]      |           |           |           |
| To harrowing with the drill harrow           | -         | 0         | 0 6½      |
| To sowing with the drill plow                | -         | 0         | 1 1       |
| To seed-wheat                                | -         | 0         | 6 0       |
| [Be it rememberd, 5 stone is enough.]        |           |           |           |
|                                              |           | <hr/>     | <hr/>     |
|                                              |           | 0         | 17 11½    |
| To four times horse-hoeing, as before stated | 0         | 5         | 4         |
| To one year's rent                           | -         | 0         | 18 0      |
|                                              |           | <hr/>     | <hr/>     |
|                                              | 2         | 1         | 3½        |
| Thus                                         |           |           |           |



Thus the land is sown again with wheat every year, and instead of 4 *l.* 9 *s.* which is the farmer's expence in the common husbandry, exclusive of one year's rent of the land : in the drill method it is no more than 17 *s.* 11½ *d.* and the total expence, instead of 5 *l.* 7 *s.* is no more than 2 *l.* 1 *s.* 3½ *d.* rent included ; whereby there is a saving of 3 *l.* 5 *s.* 8½ *d.* an acre.

Before the account of profit and loss upon these different methods of culture be stated, it will be necessary to take notice of an objection, which may perhaps be made to the above charge of plowing in the common husbandry. It is pretended, that three quarters of an acre may be plowed in a day, with one plow : but can it be done effectually ? The land may, indeed, be *scratched*, but cannot really be plowed as it ought to be. The farmer ought to be cautioned against a trick too frequently practised in plowing. When a plow-man enters his plow, and passes across the field, he turns a sod about a foot broad ; when he is to return, he enters his plow about four feet distant from the outside of the former furrow, and so turns another sod of the same breadth, which, when turned, just meets the former sod ; thus four feet of the land appear to be plowed, whereas the fact is, that the two feet lying under the sods is not touched with the plow at all. This deception, added to the practice of just *skimming* the ground, enables hirelings to undertake plowing at 6 and 7 *s.* an acre. But if a plantation acre of land be well and effectually plowed, 10 *s.* 4 *d.* as charged above, will not appear too much ; and it is, in fact, supported by the common course of business. When wheat is to be sown, it is the general custom to send a barrel of seed into the field with two plows, which is to sow an acre of land, and that is the usual day's work for two plows in the general course of business. Let us see then, what the expence will amount to. Eight cattle will be 8 *s.* two plow-men 1 *s.* 4 *d.* two drivers 1 *s.* and the feedsmen 8 *d.* which in all makes 11 *s.* and corresponds with the above charge.

Dr.

*Per Contra, Cr.*

Dr. One acre of wheat and oats in the common husbandry, for fifteen years.

|                                             | <i>l.</i> | <i>s.</i> | <i>d.</i> |                                               | <i>l.</i> | <i>s.</i> | <i>d.</i> |
|---------------------------------------------|-----------|-----------|-----------|-----------------------------------------------|-----------|-----------|-----------|
| To the expence on a wheat crop, 2d year -   | 5         | 7         | 0         | By the produce of wheat, 9 barrels, at 20s. 9 | 0         | 0         | 0         |
| To the expence on an oat crop, 3d year -    | 2         | 5         | 2         | By the produce of oats, 14 — at 6s. 4         | 4         | 0         | 0         |
| To the expence on a wheat crop, 5th year -  | 5         | 7         | 0         | By the produce of wheat, 9 — at 20s. 9        | 0         | 0         | 0         |
| To the expence on an oat crop, 6th year -   | 2         | 5         | 2         | By the produce of oats, 14 — at 6s. 4         | 4         | 0         | 0         |
| To the expence on a wheat crop, 8th year -  | 5         | 7         | 0         | By the produce of wheat, 9 — at 20s. 9        | 0         | 0         | 0         |
| To the expence on an oat crop, 9th year -   | 2         | 5         | 2         | By the produce of oats, 14 — at 6s. 4         | 4         | 0         | 0         |
| To the expence on a wheat crop, 11th year - | 5         | 7         | 0         | By the produce of wheat, 9 — at 20s. 9        | 0         | 0         | 0         |
| To the expence on an oat crop, 12th year -  | 2         | 5         | 2         | By the produce of oats, 14 — at 6s. 4         | 4         | 0         | 0         |
| To the expence on a wheat crop, 14th year - | 5         | 7         | 0         | By the produce of wheat, 9 — at 20s. 9        | 0         | 0         | 0         |
| To the expence on an oat crop, 15th year -  | 2         | 5         | 2         | By the produce of oats, 14 — at 6s. 4         | 4         | 0         | 0         |
|                                             | <hr/>     |           |           |                                               | <hr/>     |           |           |
| To clear profit in 15 years - - -           | 38        | 0         | 10        |                                               | 66        | 0         | 0         |
|                                             | <hr/>     |           |           |                                               | <hr/>     |           |           |
|                                             |           | 27        | 19        |                                               |           |           |           |
|                                             | <hr/>     |           |           |                                               | <hr/>     |           |           |
|                                             | 66        | 0         | 0         |                                               |           |           |           |
|                                             | <hr/>     |           |           |                                               | <hr/>     |           |           |





|                                                      |           |           |           |
|------------------------------------------------------|-----------|-----------|-----------|
| To clear profit arising upon an acre of land in      | <i>l.</i> | <i>s.</i> | <i>d.</i> |
| fifteen years in the drill husbandry - -             | 52        | 3         | 11        |
| To clear profit arising upon an acre of land in      |           |           |           |
| fifteen years in the common husbandry -              | 27        | 19        | 2         |
|                                                      | <hr/>     |           |           |
| Greater profit on the drilled acre, in fifteen years | 24        | 4         | 9         |
|                                                      | <hr/>     |           |           |

Which amounts to 1 *l.* 12 *s.* 3 $\frac{3}{4}$  *d.* *per annum*, for fifteen years on the acre, *more* than by the common husbandry.

In the drill husbandry the crops are stated at three barrels of wheat less upon an acre than in the common husbandry, that it may not be supposed to be over-rated; but in the common husbandry, the crops are rated at the highest; fourteen barrels of oats an acre, are also allowed in the common husbandry, which every farmer must admit to be a great allowance upon the general produce.

That the drill culture will produce six barrels an acre, is fully proved in Mr. *Baker's* report at large, which will be shortly published, where it will be shewn, that much more has been produced.

Doubtless, it will be observed, that in fifteen years fourteen wheat crops are obtained in the drill husbandry; in the common husbandry only five wheat and five oat crops; the five other years are not only lost, but are an heavy expence to the farmer.

A farmer having forty acres of tillage, supposing him to direct his attention to bringing it to the drill culture, would make in fifteen years 969 *l.* 10 *s.* more than he can in the common husbandry; which is such an advantage, that the greater profit in the drilled acre in fifteen years will purchase the fee-simple of that in the common husbandry, at twenty-seven years purchase, valuing the land at 18 *s.* an acre.

Thus it appears, that in every fifteen years the fee-simple of all the tillage lands of the kingdom, is lost to the community by the common course of tillage.

In stating these accounts, no mention is made of fences, water cutting the land, weeding and reaping, as these articles



ticles of expence depend upon variety of circumstances, but in general, will be more upon the common husbandry than the drill.

*N. B.* The instruments for the drill husbandry may be had of Mr. Baker, at *Laughlin's-Town*, near *Celbridge*, in the county of *Kildare*, where his crops, and his methods of husbandry, may at any time be viewed by any gentleman or farmer.

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

If you think the above comparative calculation between the drill and common husbandry, worth the perusal of your readers, you will please to make use of it as you may think most proper. As soon as my report at large can be printed, I will endeavour to transmit a copy of it to you. For the encouragement of such of your correspondents and readers as are disposed to enter into the drill husbandry, I cannot omit to inform you, that I now have a field under wheat in drill, which surpasses any corn I ever saw in my life, at this season, both as to colour and vigour; and it is the *third drilled* crop which has been upon the ground in succession.

I am a well-wisher to your work, and  
your very humble servant,

Dublin,  
March 26, 1766.

JOHN-WYNNE BAKER.

### NUMBER XLIII.

*Further Considerations on the planting quick-growing Trees : with some particular Observations on the Carolina Poplar and Transylvanian Hazel: In a Letter from Philosylva.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

AS I had particularly taken upon me the cause of timber-planting, too much, as I observed in my last letter, neglected by those who zealously pursue other kinds

of rural improvement, I received great pleasure from seeing the letter on the Lombardy poplar, in your next Number, published for March. As it tended to demonstrate, by another instance, added to that which I had given, the very great private, as well as public advantage, which may accrue from the planting quick-growing trees. That kind of poplar is not, however, from any intelligence I can hitherto collect at present, obtained in England; but an address was some time ago made, to the Society for promoting arts, from France on that head: and the following advertisement was transmitted at the same time to them. As it may tend to supply the means to private gentlemen of procuring this tree, and, likewise, gives an intimation of a peculiar kind of establishment in France of public nurseries, opened under the direction of the societies for promoting agriculture, which may possibly excite a desire in gentlemen of public spirit, to attempt something of a similar nature here: I have, therefore, copied the French for you, and likewise given a translation of it; which I think may do service to the cause I mean to promote, by my correspondence with you.

#### “ PEPINIERE A SENS.

“ Le bureau de la société royale d'agriculture, de la  
 “ généralité de Paris, établi à Sens, ayant proposé aux  
 “ citoyens de cette ville, l'entreprise d'une pépinière  
 “ d'arbres, forestiers, fruitiers, d'alignemens, arbrisseaux,  
 “ et arbrustes, qui peuvent s'élever en pleine terre: cet  
 “ établissement, dont, l'utilité a été généralement recon-  
 “ nue, vient d'être commencé sous la protection de cette  
 “ société. On y trouve déjà des peupliers d'Italie ou de  
 “ Lombardie, de différentes grosseurs, et des jeunes plans  
 “ de cette arbre, bien enracinés, pour faire des allées  
 “ qui suppléent aux charmilles & qui en très peu de tems  
 “ font de beauté singulieres. Tout ces plans sont élevés  
 “ sans fumier; & avec les seuls labeurs. On y distribue des  
 “ boutures d'un an, friches, & d'une bonne espece, aux



“ different personnes, qui veulent faire des pepinieres. On  
 “ indique les moyens de les planter, avec ordre, & avec  
 “ succès ; & les soins qu’on prend pour le transport, les  
 “ mettent a l’abri, des inconveniens du trajet, en quelque  
 “ lien, qu’on les envoie. On fera dans la suite en état,  
 “ de distribuer toutes les autres especes d’arbres.  
 “ On s’adressera au sieur Etienne Guigne, rue du Tri-  
 “ pos à Sens Bourgoyne.”

#### “ THE NURSERY AT SENS.

“ The office of the royal society of agriculture of the  
 “ generality of Paris, established at Sens, having proposed  
 “ to the citizens of this town, to make a nursery of forest-  
 “ trees, fruit-trees, coppice-wood, small trees, and shrubs,  
 “ which may be raised in the full ground, or open air.  
 “ Such a nursery, of which the utility has been universal-  
 “ ly acknowledged, has been accordingly lately opened  
 “ under the protection of that society. There has been  
 “ chosen for this purpose, near the town, a piece of land  
 “ of moderate goodness : and there has been already pro-  
 “ cured, Italian or Lombardy poplars of different mag-  
 “ nitudes : and young plants of that tree, well rooted, to  
 “ make walks which lead to groves, and are, in a very short  
 “ time, extremely beautiful. All these plants are raised  
 “ without dung, by labour only. Sets or cuttings of this  
 “ tree of one year, fresh, and of a good kind, are distri-  
 “ buted to such persons as are desirous to make nurseries,  
 “ and full information is given of the means of planting  
 “ them properly and successfully : while at the same time  
 “ care is taken in the package of them, to avoid their be-  
 “ ing subject to any damage in the carriage, to what-  
 “ ever places they may be sent. Provision is likewise  
 “ made to be able, in a short time, to distribute all the  
 “ other kinds of trees.

“ Application should be made to Mr. Etienne Guigne in  
 “ the rue de Tripos at Sens in Burgundy.”

By

By this advertisement it appears, that any gentlemen, who have a correspondence in Burgundy, or the neighbourhood of Sens, may procure plants of this tree ; and I make no doubt, but that from the earnestness shewn in the application to the Society of London for promoting arts, Mr. Guigne would be very ready to do whatever was in his power, to gratify any private gentleman, who should desire it of him : and the marquis de Chambray, who, as was observed by your anonymous correspondent, takes a particular pleasure in giving away sets, would certainly oblige any gentleman who would apply to him, at Fillieres in Normandy.

It appears also, by this advertisement, not only how attentive to, and assiduous in all kinds of rural improvements, the French at present are : but of what particular consequence they esteem the propagation and culture of quick-growing trees.

And I must further observe, that the establishment of such nurseries, not only as a repository for new and scarce kinds of plants, but for the distributing cuttings or sets of them, is a very effectual means of encouraging the undertaking of private persons, to make such plantations here. The giving of cuttings of mulberry-trees to all, who will make plantations of them, is one of the means, which the society of Berne have taken, for the encouragement of the production of silk in that country ; and I am informed the King of Prussia has done the same.

It were much to be wished, we were not behind the French in this particular : but that we had some public nursery or garden, which was not, merely for speculation, like those we have at present, from which there seems to have accrued very little advantage. In such a nursery the seeds, that have been sent to the Society for promoting arts, might have been raised, and their product preserved : as well as those obtained by private gentlemen, which are in all probability lost : and if plants or cuttings were, by this means, conveyed and diffused to remote parts of the coun-



country, it would be a very efficacious means of improvement, and the introduction of useful trees, &c.

But to return to the subject of the Lombardy poplar, though I am extremely desirous we should be possessed of it, yet I entertain some doubt whether we have not, at present, a tree of the poplar kind, that is at least equal to it, in beauty, quickness of growth, &c. The tree I mean is the large-leaved American poplar, commonly called the *Carolinian*, or *Carolina* poplar; which I mentioned particularly in my former letter. It is amazingly rapid in its growth, elegant in its figure, and beautiful in the verdure of its very large foliage: and, as far as I can conjecture, not inferior in its wood to the Lombardy poplar. This is likewise to be propagated from cuttings of any magnitude: which scarcely ever fail, but from some gross mismanagement, if planted at the proper season.

There are some other trees, which, like the willows and poplars, might be proper substitutes for the large forest-trees, in the view of affording timber: and there are many of a smaller kind, that might be applied to various valuable æconomical purposes, as having advantages over such as are at present cultivated for the same uses.

Among those which I consider in this first light, a very large species of nut-tree is one of the principal. It grows in size equal, at least, to the forest-trees of the second size: and shoots in upright boughs or branches, of an extreme great length and straightness. Its growth is amazingly quick: and the wood extremely tough. These qualities, of great length and straightness in the boughs, together with the toughness, would make the poles produced by it useful, and the toughness would render the wood very advantageous for many purposes. Some of the older botanical writers, mention this tree as a native of Transylvania; and say that it rivals the largest forest-trees in its magnitude: I have never seen any that were more than four years old: and if I might have concluded the future magnitude from that which they then had: I might well have adopted that belief. The figure and general appearance

ance of the trees, excepting magnitude, very much resemble the common hazel, but the nuts which I have been shewn by the ingenious Mr. Fletcher, during his residence with the late duke of Argyle, out of his collection of seeds, were very small; much less than the larger common nuts, notwithstanding the excessive bigness of the tree. The first, I have heard of, in our country, were a few raised from some nuts brought from Vienna by the earl of H—d, and which were, when I saw them, in the gardens of the late duke of Argyl at Whitton, and of the earl of Northumberland at Sion.

From the quick growth of this tree, there can be scarcely a doubt, but that it might, by proper management, be propagated from cuttings; and it could not fail, both from the straightness, largeness, and toughness of the poles, formed by its boughs, as well as from the tenacity of the wood, produced by the body of the tree, to be very useful for many purposes; and very advantageous, as arriving, in so short a time, at a profitable maturity.

Of the other kind, intimated above, that is, such smaller trees, as might answer more beneficially the indispensable uses of several we now employ, I shall only mention two, which would be, in all probability, great improvements in the making fences.

The one is a kind of haw-thorn, much resembling our common quick; but growing much faster; and rising much higher and stronger. It is found in Canada, where it is used for hedges, from whence a quantity of the haws, or fruit, was sent to the London society; who distributed them among such gentlemen, as were disposed to try to raise the trees from them. I gave some parcels of them to several of my friends, not having at that time an opportunity of sowing them myself; but I have not heard, hitherto, that any of them were raised. A kind of haw, that would make higher and thicker hedges, and in a less space of time, would certainly be a very valuable improvement; and, by the account which is given of this kind of haw-thorn, it possesses all these qualities in an extraordinary



nary degree; and it were to be wished, therefore, that if any plants were raised from this parcel of haws, the public had some account of them in due time. It is now four years since they were sent hither: but as this seed is long in rising, it will require some years more to form a satisfactory judgment.

The other plant, I recommend to further inquiry, is a kind of dwarf oak, used in some parts of North America for making hedges and fences. It grows very fast, and becomes so thick by cutting with sheers, that a bird, or mouse, can scarce penetrate it, when in full perfection. The acorns are sown in rows or drills, where the hedge is proposed to be made; which admits of being raised to a considerable height. Such a fence as this would be a screen from the wind in winter, as well as a security of the inclosure; whence a hedge of this kind would be useful for many purposes here: and the plant would, perhaps, on further examination, be found capable of being rendered serviceable in some other ways. It were to be wished, therefore, we were possessed of it.

In my former letter, in speaking of the Norfolk willow, I mentioned, that I did not know who succeeded Mr. North in his business, nor whether his successor continued to supply the sets as he had done. Some little time afterwards, being applied to by a friend, in consequence of what had been there said respecting the advantages of plantations of that tree, to procure some sets, I went to Lambeth to inquire, and found that Mr. North had resigned his business, for a year or two before his death, to one Mr. Shields, who continued it on in the same manner: and who is prepared to furnish any quantity of the willow sets. I think it a piece of justice, therefore, to mention this fact; because, being ignorant of his having long advertised, that he conducted the business, in all respects, in the same manner as Mr. North, my expressing a doubt with relation to the willow sets not being to be obtained there, might have prevented some applications, which might otherwise have been made to him. To take off the chance of any

consequence of this kind, I must declare that I found him very well provided with them, and all the plants which are usual in the nurseries; as well as a good collection of those which are more rare; and also very intelligent in the management of plantations, either for pleasure or use. Amongst the rest, he has an ample stock of the *Carolina poplar*: and could in time supply cuttings for a considerable plantation of that valuable tree: as well as of both the kinds of the mulberry-trees, if your correspondent Agricola's scheme of attempting the production of silk in England should take place, and occasion a demand for them. You will excuse my saying this, that I might avoid the chance of doing harm to a person who was then a stranger to me; but who appears, on my conversing with him, to have merit in his profession; and as, besides, it answers the further end of promoting the view I earnestly desire to effectuate, of increasing the numbers of plantations of quick-growing trees, by pointing out where the sets of the Norfolk willow are to be obtained. In my next I will endeavour to send a further aid to this design, by communicating some instructions and remarks, respecting the propagation of trees by cuttings and other expedite methods; and also a more particular account of the growth, cultivation, &c. of the *Carolina poplar*, and some other valuable trees. In the mean time I remain

Your constant reader, well-wisher,

and humble servant,

PHILOSYLVA.

NUM.



## NUMBER XLIV.

*Some further Instructions and Observations relative to the making Pot-ash, intended for the Use of the Colonies : In a second Letter from Mr. Dossie.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

**I**N my former letter to you, I complied with the request of your correspondent, T. P. in giving you the process for making pot-ash, I communicated, at their desire, to the Society for promoting arts, &c. and which, in consequence of their publishing it in their book of premiums for the use of the colonies, for the last four or five years, appears to have been a principal cause of the establishment of that important manufacture. I then subjoined to it also, at your correspondent's further desire, my opinion of the practicability, and means of rendering that process advantageous in Great Britain; and to this alone, I then confined my observations.

But that letter has occasioned my being applied to, from several quarters, for assistance in the further extension of this article in America, by establishments of manufactories of it in those parts, where they have not been already begun; and which are too remote to obtain information easily from the others.

A gentleman greatly concerned in a different branch of commerce, and well known to the Society for his liberal talents and earnest desire to serve the public, informed me, he had obtained a grant of lands for some persons under his protection, in a colony where this manufacture has not hitherto been attempted; and was going to fit them out, with a complete *apparatus* for making pot-ash, at his own expence, in order to the establishment of a work by the aid of that process: but wanted the explanation of

some particulars with relation to which, he did not think it fully explicit.

Another very able gentleman, agent of a northern colony, made similar inquiries of me, on account of a person, who has a very considerable grant of lands, in that colony, on condition of clearing them: which nothing can so well enable him to perform, as the erecting a pot-ash work, that will immediately repay him with profit, all the expence of labour in cutting down and clearing away the wood.

The same kind of information has been asked of me by several other gentlemen who are intent on the commencing this manufacture in the southern extremities of our new American possessions: and I have been thence induced to comply with these several requests, in a general way: and, at the same time, endeavour to render more diffusedly useful, through the channel of your work, the observations below given, with respect to their queries and some other material points; all which I consider, as a proper supplement to the above-mentioned process: particularly in the case of those places, where the iron part of the *apparatus* for making pot-ash cannot be made, but must be carried from hence, or had from some other distant part.

The principal queries, that have been made to me, are;

1st, *Whether the putting the ashes in casks, and keeping them for any length of time in that state, before they be used for the lye, be an indispensable, or essential part of the process?*

2dly, *What time it is requisite the water should stand on the ashes before it be drawn off, in the form of lye?*

3dly, *What is the method of distinguishing, when the last part of the evaporation, or reduction of the salt to a dry state, is compleated; and the fire should be discontinued?*

4thly, *By what marks a judgment may be formed of the goodness of the pot-ash produced?*

Besides the considerations on these queries, I have thought fit to add some remarks, that may be of very material service to those who enter on this undertaking; and who can scarcely be supposed to be so much acquainted with chemical



cal operations, as not to want a guide in every particular of importance; especially, in these colonies, where no manufactories of this kind having been established, they cannot profit by the experience of their neighbours.

In very large works, the wood for making the ashes may, in dry weather, be burnt on the ground: and it is there of some consequence, to practise the most proper manner. In such cases, the wood may be cut into logs of any magnitude, that is most convenient, to be carried or rolled: and they should be laid on a very dry firm spot of ground, in the manner of a pile, in which the greatest hollow, that can be made, should be left betwixt them. These hollows should be filled with brush-wood: which, as it burns away, should be renewed: especially in those parts, where the fire seems to slacken in the logs. The whole pile, may likewise, from time to time, be covered with brush-wood, and boughs with the leaves on them: the smothering effect of which is beneficial to the product of alkaline salt. When the fire is suffered to decline, and the whole is nearly consumed, all the remaining pieces of charcoal, or unburnt parts, should be raked together from the extremities, and thrown on the middle of the fire: and indeed the exterior part of the ashes themselves, should be so treated; and some fresh dry bush may be added, if necessary, to complete the calcination or thorough reduction to ashes, of the whole. It is extremely material that this be effectually performed, and that all unburnt parts of the wood, or charcoal formed in the burning, be carefully raked out; and either burnt or taken away. For from a neglect of this, as we shall see below, not only the last part of the evaporation of the lye, is made tedious and difficult: but the pot-ash itself depraved, and rendered unfit for bleaching; and some other uses, as well by its staining as caustic quality.

When the wood is burnt on a kiln or grate, as must be practised in wet weather, the same rules should be observed: and the fire should rather be kept in a smothering, than fierce state, till the whole be nearly consumed. But then

then the fire may be allowed to be stronger, and the ashes passed through it.

As to the first query, respecting *the putting the ashes in casks, and keeping them for some time*; that method is not essentially necessary. In very large works it would occasion embarrassment and delay: and though there may be some little gain from it, in the quantity of alkaline salt obtained: yet that does not countervail those inconveniences. The ashes may be, therefore, gently sprinkled with water, and laid in a heap in any place, defended from rain or wet, in order to be used sooner or later, even immediately, as may be commodious for the dispatch of the work.

With respect to the second query, *how long the water should stand on the ashes before it be drawn off?* The least time should be about four-and-twenty hours, especially when put on a second quantity of ashes. It may be as much longer, as is most convenient: for there is no limitation, either way: except that sufficient time must be given, for the water to dissolve the alkaline salt.

In the process given to the Society, the view was, rather to communicate the general method, and incite the trials of it in smaller quantities, and by the cheapest apparatus, than to give compleat instructions for the most profitable conduct of very large works. But at present, as it is known, advantages can be had with certainty, from such an undertaking, the apparatus should be adapted to considerable quantities, by those who begin. In this view, it will be a great improvement, to have instead of one only, two evaporating caldrons of different magnitudes, and form. The one should be as large, as can be procured to be cast; and should be wide in proportion to the depth, even as two to one. The other should be less by about two-thirds in measure; and should be twice as deep as it is wide, and of a figure nearly cylindrical, or tapering only in a small degree. They should be both of cast iron; and made as thin as possible in the upper part: but of the thickness of an inch at the bottom. The largest should be so set, that about three-fifths of its surface may be exposed to the fire:



and the lesser three-fourths. They may be set in the open fire, without any flew or worm round them, in an oven-like furnace, at about fourteen or fifteen inches from the grate or bars : and the lower and upper parts of the furnace, excepting as to the worm or flew round the pot, may be formed like that of a common culinary copper for washing or brewing.

The large caldron is intended for the evaporation of the lye, till it begin to shoot or form a pellicle or crust, on the surface of the boiling fluid : and the other, or smaller, is designed to receive the saline matter when brought to this state, in the first ; from whence it is then to be removed. There is a great advantage in this use of two pots or caldrons : because the size and form of the lesser caldron, renders the action of the heat much more effectual, and quick in its operation, in bringing the salt to a due state of dryness, and purity from the burnt oil, than those of the larger : while that, on the contrary, is much better accommodated to the aqueous evaporation, or exhalation of the greatest part of the water.

When this *apparatus* is carried from England to America ; or is to be obtained only from some distant place ; it is extremely proper to carry duplicates of the caldrons, or even three of the lesser kind. For the bottoms of cast iron vessels fail sometimes unexpectedly, in particular places, when exposed to strong heats : and if a caldron was wanting to replace any, that should fail, it would be the means of a total stop to the work, till such time as another could be sent for.

With relation to the third query, or *by what means it can be distinguished, when the last part of the operation (or what has been very improperly called in America fluxing the salt) is completed*, the following circumstances must be attended to. The salt, in the last part of the evaporation, will remain in a fluid state, notwithstanding it be of the degree of heat, that will burn vegetable or animal substances ; and will then appear blackish, or brown, in proportion as the ashes were more or less free from the coal, or burnt oil of the wood.

wood. While this appearance remains, the fire should be continued; and even encreased, if no change be produced after four-and-twenty or thirty hours, in the case of very large caldrons. The fluid will, however, at last concrete, and form a dry hard mass: which, if it appear white, on a small specimen being taken out, and suffered to cool, the fire may be immediately discontinued: but if the colour be brown, or a very dark grey, it may be kept up an hour or two longer: though these colours will not always disappear, if the lye be impure from the burnt oil, or coal of the wood, as before mentioned.

As to the last query, *how the goodness of the pot-ash is to be distinguished?* Where there is no intended adulteration, the following marks may be depended on. That the salt be white; and either of a stony or unctuous consistence, inclining somewhat to transparency, rather than powdery and opaque. That it dissolve almost intirely in water; giving only a slight whitishness, or milky cast, without any brownness. As the pot-ash deviates from these qualities, it loses of its value and marketable price: but nevertheless, though it be unfit for bleaching, and some other uses, it may be still saleable for making soap, and some other purposes.

These criterions or marks are, however, available only in cases where no depravity or faultiness is in question, but what arises from the misconduct or accidents of the preparation: for where designed adulterations, are practised, some or all of such criterions or marks may be preserved, and yet the commodity greatly debased and sophisticated. The detecting such frauds cannot be taught, without an examination of the nature and relative qualities of the several substances that may be employed in the adulteration; which would require more room than the proper compass of this letter: and indeed, the knowledge of them is more important, and requisite to the persons, who buy, than to those who make pot-ash. Since to the latter, it is sufficient to understand the degree of value of what he produces: and the best means of attaining to this value in the product



product of his operations. The criterions or marks above mentioned furnish the means of this judgment on the perfection of unadulterated pot-ash : and the best method of coming up to them in the practice, is to keep the ashes clear from any of the burnt oil, or bits of charcoal produced from the wood, whence such ashes are obtained; and the lye clear from any of the earth of the ashes, by drawing it carefully off, or suffering it to settle : and to give a sufficient heat in the last part of the evaporation, according to the preceding directions. If, nevertheless, any of the earth of the ashes be among the salt, it will be perceived, by its not dissolving on the addition of water : but this does not otherwise deprave or injure the commodity, than by taking off in proportion so much of the real quantity of the alkaline salt. Or if, otherwise, the fiery oil abound, in the pot-ash, it will be perceived by the brownness and extreme hot caustic boiling effect of it on the tongue; and by the discoloration of the water, in which any of the salt is dissolved. In any degree of this last depravity, the pot-ash loses proportionably of its value : and, in a great one, it becomes unfit for bleaching, and several other purposes, as it has sometimes then a staining quality, that will spot the linnen ; and a corrosive one, that will eat it. So that this is the principal failure, that is to be guarded against, when pot-ash is made in the manner directed by the process in question.

I should wish this letter were inserted the very first opportunity, for reasons which are sufficiently evident, from the facts mentioned in the beginning : and your compliance with that request, will oblige

Your very humble servant,

R. DOSSIE.

## NUMBER XLV.

*An Account of the Strawberry or Hop-Trefoil ; in Answer to a former Inquiry relative to it. In a Letter from Mechanicus.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

AS the reverend Mr. Comber intimates a desire of a further information relative to strawberry-trefoil, recommended to the notice of the public by Mr. Wynne Baker, see No. LX. p. 340 of the 5th Vol. of the *Museum Rusticum* ; I am much pleased that I have it in my power, to give some account of this yet little-noticed, but very extraordinary plant. I cannot pretend to enter into a just botanical description of this plant, but will attempt the best I can ; and humbly hope that Mr. Comber, and the editors, will overlook every defect of sentiment, and expression, both in this, and every past and future letter, that is and will be signed by Mechanicus.

Strawberry-trefoil, or hop-trefoil, are, I conceive, synonymous terms, being given, I suppose, to this species of trefoil, from the near resemblance of its flower, to that of hops in flower, or to a strawberry, a little before it is ripe. The colour of the root is whitish, abounding with fibres, the leaves are three together, and are small, oval, and of a palish green ; the stalks, in a natural state, are six or eight inches high ; the flowers are small, inclined to yellow, standing in oval tufts ; the seed is small, shining, and yellowish, inclosed in dark-coloured husks, in a head or cluster. Hop or strawberry-trefoil, is a native of England, and is up very early in the spring : the most severest winters do it but little injury ; and, what is most desirable, it seems to bear indifferently every kind of situation ; for I have seen it grow in low watery meadows, and upon gravelly banks, and very frequently I have seen it in the bottoms and sides of old marl-pits ; so that soil and situation, alike favour its growth.



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I am quite of Mr, Wynne Baker's opinion, that it seems to deserve particular notice, from what I have seen of its uncultivated luxuriance, and other particular properties, deserving the highest regard and attention of the curious.

I collected near an ounce of its seed the last summer, and have sown the greatest part of it in the beginning of the current month in drills, and broad-cast, along with a variety of other grass-seeds, &c. (cultivated in the same manner) some of which lucern, burnet, timothy-grass, and bird-grass, I have procured from Mr. Rocque; some are such as are in common cultivation; some I have gathered myself, with a design, in one view, (under my own manual cultivation) to make a just estimate of their comparative excellence; the result of these experiments I intend to make a part of my future correspondence \*, not doubting but the editors of the *Museum Rusticum* will give me room to make my experiments known to the curious cultivators of every promising and useful vegetable, belonging to, or necessary to make improvements in pasturage, at present the laudable pursuit of many of the correspondents of the *Museum Rusticum*: and, as I have the honour to have some regard and attention paid me by none of the least worthy of that number, I shall, with my very grateful respects, wish success to every individual concerned in promoting and encouraging so useful and laudable an undertaking, as makes the variety included in your periodical publication. None can have a greater regard for it, than,

GENTLEMEN,

Your obliged humble servant,

Near Stafford,  
April 20, 1766.

MECHANICUS.

\* We think the public and ourselves much obliged to Mechanicus, for the zeal and assiduity, with which he seems to pursue the improvements of agriculture: and the means, he declares it to be his intention to pursue, are so proper, that they cannot fail of being effectual. We shall, with great pleasure, insert in our work, any observations, that may be the result of them, and afford every other assistance in our power, to promote his views. R. E.

NUM-

## NUMBER XLVI.

*A Proposal for attempting the Production of Silk, according to Agricola's Plan, if proper Assistance, as promised by him, be given.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

**T**HIS being a very bad day, it gives me an opportunity of looking into your valuable select papers, &c. amongst which, I am greatly delighted with your worthy correspondent Agricola's hints on the silk-worms; and his rational obviations of the four principal objections, which may be alledged to its being brought to a national manufacture of great utility. I read them with pleasure to my wife, who wishes to be intrusted with some of those useful animals. I have some of the essential necessaries for carrying on this work in a moderate degree. Such as mulberry-trees, black, and white, in great numbers, and some buildings now in disuse, that may, at a small expence, be rendered very proper habitations for those gentry. I want instructions, how to put them in a proper condition to accommodate them; and also to manage them through all the various processes of the business; for which purpose, I beg Mr. Davis will send me, by the bearer, Mr. Pullen's treatise, of which Agricola makes mention, or favour me with any other \* assistance you think will contribute to my design. Whatever progress and success, I make in this or any other like undertaking, I will readily transmit to you; and am Your humble servant, &c.

Lambeth, April 2, 1766.

J----- S---ds.

\* We are extremely glad to find the effects of Agricola's endeavour to introduce the production of silk into Great Britain so soon take place; and we doubt not but he will do his utmost to procure Mr. S---ds all the assistance he has promised. As to our own parts, we shall readily lend our aid to promote so laudable a design, as well by any private as public means in our power; and shall think it the greatest honour to our own undertaking, that it has or may contribute, to the establishment of an art, pregnant with so many, and such great national advantages. E. O.



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# Museum Rusticum, &c.

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For M A Y, 1766.

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VOLUME the SIXTH.

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NUMBER XLVII.

*An Account of the extraordinary Size of neat Cattle and Sheep  
in Tees Vale, and the Neighbourhood of Yarm.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

**Y**OUR correspondent Mechanicus, whom I honour for his ingenuity, and good sense, seems to speak of the weight of his neighbour Stubb's bull as something very extraordinary.

The weight of the quarters, however, and even much higher weights, are very familiar to us here: and in the sheep way, I can tell him, for the honour of the Tees Vale, that William Story, farmer, and at that time under-tenant to Mr. Stephenfon of Trafford-Hill, near Yarm, had, about seven or eight years ago, a tup, which, at three years old, weighed (as was found on trial in the field before several people present on the occasion) twenty-eight stone, and six pounds (14lb. of sixteen ounces each to the

VOL. VI. No. 32.                      S s                      stone.)

stone.) This tup was sold, by him, to Mr. Banks, of Harworth, near Darlington, for fourteen guineas, with which he earned a great deal of money, by riding the ewes of the neighbouring gentry, and others, at half a guinea each ewe.

Robert Gibson, Esq; of Newsham Banks, to whom this neighbourhood is greatly indebted \* for his indefatigable care, and assiduity, in promoting, by every means in his

\* It were to be wished, that a more general attention were had to the improvement of the breed of every kind of animal, and vegetable, which are appropriated to any æconomical purposes. In almost all instances of peculiar properties and qualities in the individual, the progeny, for the most part, more or less, partake of the same, though in very various degrees; and some particulars not at all. If, therefore, those of them, in which such qualities are most predominant, be successively selected for breeding, the qualities themselves will be greatly augmented, even to a very high degree, in many cases. This principle extends as well to form and magnitude, as to dispositions, passions, and other qualities: and to vegetables, with respect to their proper æconomy, as well as to animals. The peculiar soil and climate of places, adds much to this in many cases: and the qualities imputed to the breed, by the effect of soil and climate, will frequently continue in the race for a considerable time. It would be, therefore, a great improvement, in many places, to change an inferior breed intirely, with respect to neat cattle and sheep; and to bring, from some favourable part, a fresh stock, chosen on both these principles: that is, to have the largest kind, as far as it seems to depend on the place they are taken from; and the largest particulars of that kind: for these two causes of largeness in the breed, when combining, will give a greater security of the continuance of the desired quality, than either of them singly. This is to be done originally by persons of property only: but if, according to the example of the gentleman, mentioned in this letter, many others would attempt improvements of the same nature, particularly in places, where at present the breeds of each kind are small and defective; not only very great advantages would accrue to their respective neighbourhoods, and the public in general, but an ample profit to themselves. In this view, we think communications of extraordinary instances of size, produce of wool or milk, or any other valuable qualities, may be very interesting and serviceable: as they not only furnish the motives of executing such designs; but the means, by the knowledge of which parts of the country, or particular places, may supply what is wanting for such improvements. O.

power,



power, the breed of fine large sheep, in this county, has now a tup, got by the above, which (though never, that I have heard of, weighed,) is thought, by most judges, though something inferior in weight, to be a more compact well-made sheep than his sire. This tup, Mr. Gibson has suffered to ride ewes at half a guinea each; and, I am told, intends to advance him to a guinea next season.

Mr. Banks of Dinsdale, brother to Mr. Banks of Harworth, about five years ago, clipped twenty-two pounds and a half of wool, from off a tup lamb: and a gentleman, in the same neighbourhood, clipped sixteen pounds of wool from off of an ewe five years old.

If these may be esteemed articles worthy a place in your useful miscellany, you are at liberty to publish them. A want of the powers of description, has long prevented my being a contributor to your very useful and commendable work, otherwise than by buying it myself, and recommending it to others. I wish it could be afforded lower than a shilling a number, as I am persuaded it is the price that prevents its being bought, by numbers of very intelligent and sensible farmers in this neighbourhood: some of which are my tenants, and have given me that reason in excuse, when I have strongly recommended it to them: as I have done to many others.

I heartily wish you success, and the encouragement your entertaining, and very useful undertaking, deserves from the public.

I am, GENTLEMEN,

Much yours,

Yarm, April 30, 1766.

T. K.

*P. S.* I have made some experiments on lucern, burnet, and Timothy-grass; which I will take some other opportunity of communicating to you: but at present I have not leisure.

## NUMBER XLVIII.

*Observations of the Advantages of Peat-Ashes, in dressing Land,  
and the Manner of preparing and using them.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

**Y**OUR very constant correspondent, Mr. Comber, in No. 58, of your Fifth Volume, gives you some observations on peat-ashes; as they are commonly made, and used in Yorkshire. It is possible, that when made in the manner he mentions, and afterwards exposed for several months together, in an open dunghill, to the sun, air, and rain, they may have some fertilizing quality still left in them; but, I fear, hardly such as is sufficient to make them worth the trouble of carrying out upon the land. Peat-ashes, purposely and properly burnt for a manure, are noble improvers, both of corn, and grass land: but the substance, from which they should be got, is an understratum of the peat; where the fibres and roots of the heath, &c. are well decayed. Indeed, the very best are procured from the lowest stratum of all. This will yield a large quantity of very strong ashes, in colour (when first burnt) like vermilion, and in taste very salt, and pungent. Great care and caution should be used in burning these ashes; and, also, in preserving them afterwards.—In the first place, the peat should be consumed as slow as possible: the fire being but just kept alive; and never suffered to flame out. It should, therefore, be constantly attended in the day-time; and well covered up at night, with an addition of fresh peat, laid on the outside.—If, in the morning, it should be found too low, and in danger of being extinguished, either by rain, or too close a covering, stirring it up, with a strong stake, (kept ready for that purpose) and thrusting a little dry



dry turf, or brush-wood, into the middle of the heap, will very soon restore it to a proper degree of heat. One man will keep about a dozen fires going: and they will, in a summer season, produce a very large quantity of these most valuable ashes. About the middle of September, (before the autumnal rains come on) the fires should be smothered out; by laying, on every heap, a large covering of heath parings; so as to prevent any air from getting into the heaps; in order that they may cool gradually; and be kept from any rain that may happen to fall before they can be removed. As soon as the ashes are cool enough, to be safely carried, and laid together, they should be conveyed into some shed, or covered place; where they may be kept, quite dry, and unexposed to the sun and air. A calm day should be chosen for the above purposes; as the ashes, at first, are very light, and liable to be blown away, by a moderate wind. Thus burned and preserved, they will be found an excellent hand-dressing, in the following spring, either for corn, or grass land.—Immediately after the last hay-harvest, I put out one of my fires, in order to make a trial upon some four parts of a meadow, betwixt these ashes (set on quite warm), and soapers waste. The former (in a great measure) destroyed the rushes, and other bad kinds of grass; and, in their stead, produced great quantities of natural clover. When the cattle were turned into the aftermath, in the October following, they were so tempted with the sweetness of the ground, where the ashes were spread, that they eat it quite bare, long before any other part of the close. The effects are still very visible; and will, I dare say, be so a long time. But I cannot expect so lasting an improvement from them, as from the soapers' waste; which is a noble and desirable tillage; when to be procured upon moderate terms. But such is the demand for it, in this neighbourhood, that they now sell it at a shilling a bushel.—They burn great quantities (I believe) of peat-ashes in some parts of Berkshire; and esteem them (as I have heard) one of the best dressings for their spring crops.—I could wish some of your readers, who know the method  
used

used there, both in burning, and preserving them, would be so good, as to favour the public, with an accurate account of it, through the channel of your publication. Such an authority, might induce many to make use of so excellent a tillage, and procured too upon such easy terms in many parts of the kingdom, who now intirely neglect it, for want of knowing its excellence, or the proper manner of procuring it.—As I am upon the subject of ashes, I will beg leave to mention a very great improvement, that may be made (and at a moderate expence) with coal-ashes; which, when properly preserved, are also an excellent tillage. The best, indeed, of all others, in my opinion, as I shall mention hereafter from experience, for speedily breaking, and improving black, moorish, or benty land.—The improvement is, putting a bushel of lime, in its hottestt state, into every cart-load of coal-ashes, when carried out upon the land; in order to be spread thereon; covering it up in the middle of the heap for about twelve hours, till the lime be intirely fallen; and then incorporating them well together, by turning them over two or three times: by which, the cinders, or half-burnt parts of the coals, which are noxious to the ground, instead of being useful, will be reduced to as fine a powder, as the lime itself.—I have observed before, that peat-ashes should be kept under a cover. The same injunction is quite as necessary, with regard to coal-ashes: and the expence of building a *proper one*, would be very soon repaid, by the superior quality of *such ashes*, over *those*, that are exposed to the weather.

I mentioned above, “that coal-ashes were, in my opinion, the quickest breakers, and improvers, of moorish, “and benty land.”—This I have experienced upon some ground of that kind; which I mentioned to have drained, in a former letter, to you, gentlemen.—I had two pieces, that were very strong and stiff with heath roots and benty grafs, which were broken up about the middle of last June. Upon one of them, I set lime only in the quantity of two hundred bushels to an acre. Upon the other, I laid a moderate covering of coal-ashes, mixed with a



small quantity of lime. On stirring those two pieces about a month ago, in order to have them laid down with barley and grass-seeds, I found the former altered considerably, but still rather untractable, and requiring a good deal of breaking with the harrow, in order to bring it into a tolerable good tilth; but the latter, as fine and mouldy, as a well-cultivated garden; and requiring no other breaking, than that of a few thorns drawn over it, just to cover the seed.

Mr. Comber, in the next number of the same volume, with much reason, recommends the planting of the great maple, commonly called the sycamore: as it will certainly grow very well in many soils, which are too dry for most of the other kinds of forest-trees: and will also soon arrive at a large size.—He is much pleased with the produce of his own; and thinks it unparalleled. But I have sold, and known sold, trees, short in age of his, for more money: and yet they were of the vulgar kind; and could boast no noble descent, “*around their heads no lineal glories shone.*” As to the circumstance of the poor blind mole’s elevation and cruel fate, it is certainly a most extraordinary one; and I wish, with *that gentleman*, that some of your correspondents, who are connected with the Royal Society, would favour us with an explication of that surprising phænomenon: if any gentleman, of that learned and respectable body, will condescend to treat upon so *bumble a subject*. If not, possibly, should *you, gentlemen, desire it*, I may offer my conjectures, corroborated with an almost parallel story, which I had some years since, from a very worthy gentleman, who in his younger age *had travelled*.

I am, GENTLEMEN,

Your constant reader,

Lancashire,

and humble servant,

April 18, 1766.

R. T.

P. S. You, gentlemen, receive this upon the same terms as the last, to amend, alter, prune, or oblivate, the whole, or any part, as most conducive, in your estimation, to your useful plan.—Vanity, in any literary performance,

formance, is disagreeable. In yours, solely calculated for the public good, insufferable and disgusting.—I wish a *certain* gentleman may not have been so to some of your readers and admirers.—If that *foible*, and an *improper warmth* and *petulency* of temper, could be corrected with *lenitives*, his zeal and activity might be very useful.—He means well, but is too hasty in conclusions, and impatient at the shadow of a contradiction to his *ipse dixit*.—This postscript is intirely to you, gentlemen editors, who will, I hope, excuse it, as it is truth, and proceeds *only* from my good wishes to your undertaking—for the gentleman, I hint at, never offended me, nor was ever known by me, but by his writings in your publication.

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#### N U M B E R XLIX.

*Observations on the Profits of grazing or feeding Cattle; tending to show, the little Advantages accruing therefrom, under the present Circumstances: And exemplified by a particular Account, and Estimate of the Expences, and Return, of feeding horned Cattle, with Oil-Cakes.*

To the Editors of the MUSEUM RUSTICUM,

GENTLEMEN,

**M**ANY of the farmers in this county, having fattened large cattle for the London market, with oil-cakes, I have collected the following particulars, from one of them, who is very sensible, for the benefit of such of your readers, as may be inclinable to try the experiment of this kind of feed: and in order to free the graziers from the accusation of their enhancing the price of meat; and to obviate the bad consequences of partial representations.

Cattle were at so high a price last year, from Midsummer, in all the fairs in this part of the kingdom, that, though we had scarce any grass, and a very indifferent crop of turneps, a steer, of any moderate size, was bought in at one pound more than he was really worth; and when sold at the present price, did not, therefore, pay the grazier for any contingency in the course of fattening him,  
nor



nor even for his trouble and labour, allowing nothing for his hazard.

In such a season, oil-cakes were much made use off, as the quickest, surest, and cheapest method, of fattening the large short-horned cattle, called Yorkshire wolds; which were of too weighty a size for any but the London market. These cattle, according to their bulk, were bought in at the price of from seven pounds, to twelve pounds *per* bullock, (some indeed at a higher price). The oil-cakes were at first, bought at the price of five pounds, and rose afterwards to six pounds *per* thousand. One thousand five hundred cakes are a good waggon load, if to be carried two miles from the mill; and two such loads are a good winter day's work. One thousand of these cakes were thought sufficient to fatten a steer, the original price of which, was seven pounds. But it was found, that near one thousand two hundred would have been proper to have fattened him compleatly. Such a steer, had two pecks and a quarter of the oil-cakes *per* day, at three quarters of a peck at a time; (one cake fills a quarter) five pails of water *per* day at twice watering; and straw or rather hay at night. With all these expences, my friend's account stands thus:

| Cr.                                      | l. | s. | d. | Dr.                            | l. | s. | d. |
|------------------------------------------|----|----|----|--------------------------------|----|----|----|
| By 7 steers at 7 <i>l.</i> <i>per</i>    |    |    |    | By 7 steers, bought            |    |    |    |
| steer - - -                              | 49 | 0  | 0  | at the same time,              |    |    |    |
| By 7000 cakes at                         |    |    |    | fattened upon an               |    |    |    |
| 5 <i>l.</i> 5 <i>s.</i> <i>per</i> thou- |    |    |    | average up to 44 $\frac{1}{2}$ |    |    |    |
| sand - - -                               | 36 | 15 | 0  | score <i>per</i> steer,        |    |    |    |
| By one month's                           |    |    |    | and sold at Smith-             |    |    |    |
| grafs, before stal-                      |    |    |    | field, at different            |    |    |    |
| ling for the cakes,                      |    |    |    | times and prices,              |    |    |    |
| at 1 <i>s.</i> 6 <i>d.</i> <i>per</i>    |    |    |    | the latest after               |    |    |    |
| steer <i>per</i> week -                  | 2  | 2  | 0  | full four months               |    |    |    |
| By driving to Lon-                       |    |    |    | keeping - - -                  | 92 | 2  | 0  |
| don market at 5 <i>s.</i>                |    |    |    | Deduct Cr.                     | 89 | 12 | 0  |
| <i>per</i> steer - - -                   | 1  | 15 | 0  |                                |    |    |    |
|                                          |    |    |    | Remain Dr.                     | 2  | 10 | 0  |
|                                          | 89 | 12 | 0  |                                |    |    |    |

The muck, from the above steers, is thought equal to the expence of carting home the cakes two miles; supplying them with straw for night-food and litter; and for payment of a servant, at seven shillings *per* week, to attend them.

Some put the steers, to the cakes immediately, without turning them to grafs first. The best, in this neighbourhood, were treated so; sheep, and hogs have been fattened with these cakes. They eat them greedily; but I have not learned, with what success to the farmer.

To make this account, if useful at all, as much so as possible, I will conclude it with the contrast of the expence, and advantage of five scots, and two spaved heifers, fed abroad on grafs, hay, and turneps, from last August to last March; and sold to the village butcher for his country customers.

| Cr.                                    | l. | s. | d. | Dr.                        | l. | s. | d. |
|----------------------------------------|----|----|----|----------------------------|----|----|----|
| By 5 scots at 4 <i>l.</i> 13 <i>s.</i> |    |    |    | By 7 scots fattened        |    |    |    |
| per scot - - -                         | 23 | 5  | 0  | on an average to           |    |    |    |
| By 2 heifers - - -                     | 8  | 17 | 0  | twenty-four and a          |    |    |    |
| By grafs at 1 <i>s.</i> 6 <i>d.</i>    |    |    |    | half score <i>per</i> bul- |    |    |    |
| per week <i>per</i> bul-               |    |    |    | lock, bought and           |    |    |    |
| lock - - -                             | 7  | 7  | 0  | fold together, the         |    |    |    |
| By four acres of                       |    |    |    | last taken away            |    |    |    |
| turneps at 2 <i>l.</i> <i>per</i>      |    |    |    | after seven months         |    |    |    |
| acre - - -                             | 8  | 0  | 0  | keeping - - -              | 49 | 0  | 0  |
|                                        |    |    |    | Deduct Cr.                 | 47 | 9  | 0  |
|                                        | 47 | 9  | 0  |                            |    |    |    |
|                                        |    |    |    | Remain Dr.                 | 1  | 11 | 0  |

The dung, from the above bullocks, is supposed equal to the value of the hay, they had every evening during winter; and to the expence of pulling, and carting the turneps to them. Small as the profit of these was, it must have been less, had not beef been in our country markets at five shillings and ten-pence *per* score; and at this price, offal, tallow, and skin, perhaps excepted, the



butcher could only get, about a guinea by this lot, as appears from the following bill.

|                                                                   | l. | s. | d. |
|-------------------------------------------------------------------|----|----|----|
| By sale of 7 Scots, weight $24\frac{1}{2}$ score <i>per</i> Scot, |    |    |    |
| giving $171\frac{1}{2}$ score meat, at 5s. 10d. <i>per</i> score  | 50 | 0  | 5  |
| By purchase of ditto - - - - -                                    | 49 | 0  | 0  |
|                                                                   |    |    |    |
| * Butcher's profit                                                | 1  | 0  | 5  |
|                                                                   |    |    |    |

Essex, Braintree,  
April 26, 1766.

Yours, respectfully,  
C.

### NUMBER L.

*Observations on the Injury done to Grass-Land by Ants, or Pismires; and on the Means of destroying them.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

**A**MONGST all those various subjects, that may be supposed, not improperly, to come within the plan of your *Museum*, I do not remember, that any mention has been made of that laborious, yet pernicious insect, the

T t 2

*Pis-*

\* This account of the expence and profit of the grazier and butcher, seems very candid and fairly stated: admitting the justness of it, the cause of the dearness of provisions, is less to be imputed to the monopolizing practices, or exorbitant profits of graziers and dealers in cattle, than to the accidents of the last season, and the general advance in the price of lean cattle and fodder. This shews the very great importance of the improvement of pasturage; particularly with respect to such kinds of herbs or roots, as will stand all the rigour and extremities of frost moisture, heat, and drought: and reflects great honour to the Society for promoting arts, &c. whose laudable endeavours on this score, have occasioned many attempts, that seem to promise the most advantageous consequences, respecting this momentous pursuit. A. O.

*Pismire.* It lays waste many pieces of land, forming thereon little barren hills, composed of small particles of sand, lightly, and artfully laid together, convenient for themselves and their own societies, but destructive to the lands of the farmer; deducting, from the valuable quantity thereof, as much as these *Habitatiunculæ* of their's cover; which may be often computed at a tenth part, or more of his useful grass-lands. Nay, in some places, where negligence has suffered them to multiply, almost half has been rendered useless: the hills standing as thick together, as grass-cocks in hay time: and, what is most surprising, this indolence of their's is defended, by affirming, that the area or superficies of their land is hereby increased: whereas it is well known, by the industrious, that very little or no grass, ever grows thereon; and that, therefore, though the surface be increased, the produce is proportionally decreased. As to the methods of destroying these insects, I have not known any sufficiently effectual; and therefore write this

*Ut fungar vice cotis; acutum  
Reddere quæ ferrum valet, exfors ipsa secandi.*

to excite some person who has had experience herein, to communicate his methods and success to the public. It has been a custom in many places at the beginning of winter, and often when the weather was not very cold, to dig up the ant-hills, three or four inches below the surface of the ground; and then to cut them in pieces, and throw them about. But this only disseminates them, as it were; and does not destroy them; they can hide themselves amongst the roots of the grass for the present; and then collect themselves together again upon any little eminency, of which there are great numbers ready for their purpose, *viz.* the circular ridges round the hollows, where the hills stood, as is very soon visible to any curious observer. Now as ants, bees, wasps, and various sorts of insects and animals, are so very tenacious of their *Nidus's*, as not to be easily



easily driven from thence, I thought it proper to cut off the hills entire, and even with the surface; and to let them lie whole, at a little distance, with the bottom upwards: that the ants continuing in their habitations, the rains might run into those holes of communication, (which may be seen as large as the hollow of a quill, and very numerous in the place where the hill was taken from, as likewise in the hill itself reversed); or that the frosts might sooner penetrate into their dwellings; and destroy them. Perhaps a little foot, sown upon the places; and washed in with the rain might have a better effect. The hills, when made mellow by the frosts, may be broken and dispersed about on the land. What is here said is chiefly upon theory; and what I have begun only the last winter to try by experiments: which, if successful, may perhaps be communicated in another paper. The cutting the hills even with the surface, has one advantage: that it leaves the pasture-land even and fit for mowing; has a better view, and more agreeable appearance; and, the little eminences being taken away, the insects are more exposed to the wet: which is disagreeable to them.

There is another case, with respect to these insects, which I have made trial of more effectually, in the wet summer, 1764.

In wet weather these insects accumulate cavernous heaps of sandy particles amongst the grass, called by the labourers, sprout-hills; which quickly take off the edge of a scythe. These hills, which are very light and compressible, I have caused to be stamped down, with the feet of the hay-makers, after trial first made by myself; and find, that these insects, eggs, and earth, may be easily pounded to a mortar: which should be repeated a second or third time, after the itinerant foragers are returned from their quest of food; and have begun to raise new structures, near the old demolished habitations.

I propose for the future, if there happen again to be great numbers of them, where the experiment has not been made, to make it one person's business, to pound their  
bodies

bodies and eggs together into one common mucilage. One person may be employed with a rammer, to follow five or six mowers, when there happens to be a wet summer; and beat them all down immediately level with the ground: and to do the same over again along with the hay-makers, that if any escape, or begin again to form societies, they may be effectually extirpated. I hope, that further experience will give us encouragement to pursue this method; and thereby very much to thin, if not totally destroy them.

What I have written is part from theory and part from practice, which I submit to the consideration of others, and would be glad to know their sentiments, or methods if more speedy or effectual for lessening this inconvenience, by which they will oblige their's, and,

Milton, May 1,  
1766.

Your humble servant,  
W. R.

*P. S.* Soon after writing the above, I observed, that the ants, excited thereto by this showery season, have begun to collect, and heap together, small particles of sand amongst the grafs: and that there are already great numbers of eggs deposited within the encreasing hills. I have, therefore, without delay, sent a man with a rammer to pound together all he could find; it being much easier and sooner done when the hills are small, than afterwards: and may probably very much diminish, if not totally prevent the labour of pounding them together when the grafs is mown.

May the 5th.



To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

AS I am a friend to your useful undertaking, I am willing to throw in my mite towards advancing the ends of it; and, I think, I cannot do this more effectually, than by publishing, through the channel of your paper, the result of some experience, in the practice of drilling wheat: and this I am inclined to do for the following reason. There is something so very plausible \*, and in-

\* There is no undetermined question of greater consequence to agriculture than, "*Whether the drill or broad-cast method of culture, be most profitable in general, or under particular circumstances, for corn.*" This question, therefore, is of too much moment to rest on it any hypothesis relating to fertilizing principles, &c. and it is with pleasure, we see measures taken for the deciding it by facts.

We call it an undetermined question, because, in our last account, we published an estimate, made by Mr. Wynne Baker, of the comparative advantages of these methods, founded on the data afforded by the result of actual experiments, tending to prove, by clear calculations, that the drill method has a most manifest and considerable superiority over the broad-cast: and now, on the other hand, we insert another estimate, apparently founded on facts of valid authority, which, if admitted, renders the contrary equally evident: as shewing the drill method is attended with loss, when compared with the best broad-cast.

This leaves us in the utmost degree of doubt, as far as we rest our opinion on these two accounts: and yet the interesting nature of the question calls for an elucidation. The broad-cast is the old, and almost universal, practice at present: the drill method is a proposed improvement, not yet introduced, but in a very small degree: but which is yet big with so many benefits, if the allegations made by the advocates for it be true, that we ought not readily to admit of opinions to its discouragement. It is not the greater produce of this method, in proportion to the expence, which makes the principal object: but it is, that labour supplies in it the place of manure, and fallow; and thus that limitation of the improvement of land is taken away, which attends on the use of dung: and the whole quantity of arable ground, is virtually increased, by avoiding the temporary waste of fallow: considerations, which, on the most moderate computation,

deed rational, in the arguments for this method, drawn from the advantage of admitting the fertilizing principles of the atmosphere, into the soil, by a perfect pulverization, that it is no wonder gentlemen are induced to take up a high opinion of the practice, by reading what the writers on this subject assert in favour of it. A partial calculation formed, not from particular experiments continued for a time adequate to the purpose, but from the produce of the first year of the drilled crop, where the soil is prepared by a whole summer's fallow, with exaggerated expences charged on one side, and such as are much too small, on the other, finishes the conviction; which the theory of the cœlestial influences had prepared the mind to receive. The drill, and the plough, go to work.—The first crop, though not yet quite equal to the sanguine expectations of the driller, is pretty good: and he sows again with the notion, that this is to be increased next year, by the *melioration* of soil; which, as he has read, is the certain effect of this method of culture. Unluckily the second crop is worse than the first: and the succeeding crops prove, that, notwithstanding the virtue of the hoe-plough, the land is advancing to the state, which is diametrically opposite to that of melioration.

That this is a true history of drilling, is evident from a plain fact, open to the observation of all, *viz.* That this method is discontinued by all, who try it, in the course of a few years. This fact, I assert to be true, as far as my own observation, or intelligence, reaches; except in one instance: which is, that of a gentleman near Reading (Sir H. B. \*) But whatever becomes of this one instance,

computation, exhibit a very great gain to the public. The advantages of substituting labour for manure, we before touched on, in a note on Mr. Ladner's letter, in our last number, page 235. R.

\* If that gentleman does still continue this practice with success, (which I doubt), it would be a public service, to inform his countrymen, by means of your *Museum*, of the particulars of his management, and the nature of his soil. *Inglor.*

the



the above-mentioned fact is certainly in general true: and the general truth of it is, an indisputable proof, that the drill-husbandry for wheat does not answer. For men do not discontinue methods of business, which they find profitable, to take up others, which they know to be less so. But I should not have given you the trouble of perusing this paper, if it were to contain only general observations. To come, therefore, to particular experiments, which seem to carry some information with them concerning the utility of drilling wheat, I have tried this method four years. In the first year I had twelve acres; which had been brought into very good order by proper tillage; and were well cultivated in this method, during the growth of the crop. The produce of these was twelve bushels *per* acre.

In the second year, I had thirty acres of drilled wheat, well prepared; and well hoed. The produce of these was nine bushels and two-thirds *per* acre.

In the third year, I drilled twenty-four acres with wheat; which produced nine bushels and a half *per* acre.

In the fourth year, I drilled eighteen acres with wheat; which produced seven bushels and a half *per* acre.

From these crops, I presume to conclude, that, from this land, ten bushels *per* acre is the utmost that is to be expected by drilling; and, I must inform you, that, from the same land, in the ordinary course of husbandry, I have twenty bushels on a tilth-acre of wheat: and, in a tolerable season, four quarters of oats after wheat. These crops, I mention as some of the *data* necessary for the forming a calculation to determine the respective advantages of the common course of husbandry, and of the uncommon one by drilling. For which calculation the following *data* are, likewise, necessary.

1. At an average, fifteen bushels of wheat comes from a load of straw.—This wheat, at four shillings *per* bushel, is worth three pounds: and the load of straw is worth one pound. So the straw is, to the wheat, in value, as one to three.

2. Four quarters of oats generally come from two loads of straw. These oats, at an average, are worth three pounds (at fifteen shillings *per* quarter): and these two loads of straw are worth one pound. So here, also, the straw to the grain is, as one to three.

3. One load of clover-hay *per* acre is a moderate crop. Three are sometimes got. But I do not put it higher: as I charge nothing for ashes to dress the clover.

4. The price of ploughing an acre, I put at ten shillings: which is somewhat above the ordinary price. But, I am certain, that, according to the present price of horses, horse-meat, labour, and farm-utensils, the farmer, whose team does not earn ten shillings a day, when they do work, is not paid for his team.

5. A drilled acre may be considered as being ploughed four times in the year. The intervals should be ploughed twice after harvest.—This is equal to one ploughing of the whole field. Then the new ridges are formed by ploughing the whole land: and during the growth of the crop, the four hoeings are equal to two ploughings of the whole field. The speculative driller will object here; and say,—I hoe with two horses, you plough with four in the ordinary way. Therefore, two of my hoeings are not equal in expence to one of your ploughings. I answer,—Two horses are not sufficient for hoeing.—If the land be at all strong, it will require three horses: and whether the fourth horse (which you must have to plough your ground properly after harvest) lie still, or not, makes very little difference in your expence.

The other articles in the calculation, being at the known prices within thirty miles of London, we will now proceed to the *criterion* of the two methods, by comparing the expences, and the produce of each of them.

Farmer A. has forty-five acres of arable; which he disposes into five portions. He has every year nine acres fallow: nine in tilth wheat: nine with oats, and clover-seed sown among them: nine under clover: and nine under lay-wheat; *i. e.* wheat sown on the back of his clover-lay.



lay. His land is at ten shillings *per* acre rent. What then are his expences on the sixty-five acres? His expences on his several crops will stand thus :

*Expences for nine Acres of Tith Wheat.*

|                                                                          | l.    | s.    | d.    |
|--------------------------------------------------------------------------|-------|-------|-------|
| Four ploughings to prepare, and one to sow the land - - - - -            | 22    | 10    | 0     |
| Seed-wheat, two bushels and one-eighth <i>per</i> acre, nearly - - - - - | 4     | 0     | 0     |
| Rent for two years - - - - -                                             | 9     | 0     | 0     |
| Carting and spreading dung, about - - - - -                              | 5     | 0     | 0     |
| Reaping, at six shillings <i>per</i> acre - - - - -                      | 2     | 14    | 0     |
|                                                                          | <hr/> | <hr/> | <hr/> |
|                                                                          | 43    | 4     | 0     |

*Expences on nine Acres of Oats.*

|                                                                                  |       |       |       |
|----------------------------------------------------------------------------------|-------|-------|-------|
| One ploughing - - - - -                                                          | 4     | 10    | 0     |
| Seed, four bushels <i>per</i> acre, at two shillings <i>per</i> bushel - - - - - | 3     | 12    | 0     |
| Harrowing - - - - -                                                              | 1     | 2     | 6     |
| Clover-seed, three shillings <i>per</i> acre - - - - -                           | 1     | 7     | 0     |
| Rent - - - - -                                                                   | 4     | 10    | 0     |
| Mowing and raking, at two shillings <i>per</i> acre - - - - -                    | 0     | 18    | 0     |
|                                                                                  | <hr/> | <hr/> | <hr/> |
|                                                                                  | 15    | 19    | 6     |

*Expences on nine Acres of Clover.*

|                                                               |       |       |       |
|---------------------------------------------------------------|-------|-------|-------|
| Mowing and making, at six shillings <i>per</i> acre - - - - - | 2     | 14    | 0     |
| Rent - - - - -                                                | 4     | 10    | 0     |
|                                                               | <hr/> | <hr/> | <hr/> |
|                                                               | 7     | 4     | 0     |

| <i>Expences on nine Acres of Lay-Wheat.</i>        |           | <i>l. s. d.</i> |
|----------------------------------------------------|-----------|-----------------|
| One ploughing                                      | - - - - - | 4 10 0          |
| Seed-wheat, two bushels and a half <i>per acre</i> | - - - - - | 4 10 0          |
| Harrowing                                          | - - - - - | 1 2 6           |
| Reaping, at six shillings <i>per acre</i>          | - - - - - | 2 14 0          |
| Rent                                               | - - - - - | 4 10 0          |
|                                                    |           | <hr/>           |
|                                                    |           | 17 6 6          |
|                                                    |           | <hr/>           |

Thus the totals of the expences, on these forty-five acres of Farmer A. are,

|                         |           |         |
|-------------------------|-----------|---------|
| On his tilth-wheat crop | - - - - - | 43 4 0  |
| On his oat crop         | - - - - - | 15 19 6 |
| On his clover crop      | - - - - - | 7 4 0   |
| On his lay-wheat crop   | - - - - - | 17 6 6  |
|                         |           | <hr/>   |
|                         |           | 83 14 0 |
|                         |           | <hr/>   |

The produce of these forty-five acres stands thus :

|                                                                                                                                                               |           |         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------|
| The tilth-wheat, one hundred and eighty bushels,<br>at four shillings <i>per bushel</i> (twenty bushels<br><i>per acre</i> )                                  | - - - - - | 36 0 0  |
| The straw from this crop                                                                                                                                      | - - - - - | 12 0 0  |
| Nine acres of oats give thirty-six quarters, which<br>at fifteen shillings <i>per quarter</i>                                                                 | - - - - - | 27 0 0  |
| The straw from the oat crop                                                                                                                                   | - - - - - | 9 0 0   |
| Nine acres of clover give nine loads of hay, which<br>at forty shillings <i>per load</i>                                                                      | - - - - - | 18 0 0  |
| Nine acres of lay-wheat give one hundred and<br>thirty-five bushels, at fifteen bushels <i>per acre</i> ;<br>these, at four shillings <i>per bushel</i> , are | - - - - - | 27 0 0  |
| The straw of this crop                                                                                                                                        | - - - - - | 9 0 0   |
|                                                                                                                                                               |           | <hr/>   |
| Total of the produce of the forty-five acres                                                                                                                  | - - - - - | 138 0 0 |
|                                                                                                                                                               |           | <hr/>   |

Farmer



Farmer *D.* drills forty-five acres with wheat every year. I will suppose his land got into drilling order; and charge nothing for that: as it is an expence of only the *first* year. Though by the way, a *heavy* one for that year. But, however, I will take only the annual expence incurred every year after the *first*. With this advantage given to him, Farmer *D.*'s account will be this:

*Expences on forty-five Acres of Drilled Wheat.*

|                                                            |           |           |           |
|------------------------------------------------------------|-----------|-----------|-----------|
| Four ploughings, as the work is before stated in           | <i>l.</i> | <i>s.</i> | <i>d.</i> |
| <i>data</i> , five and four - - - - -                      | 90        | 0         | 0         |
| Rent for one year - - - - -                                | 22        | 10        | 0         |
| Seed wheat, forty-five bushels, at four shillings          |           |           |           |
| <i>per</i> bushel - - - - -                                | 9         | 0         | 0         |
| Drilling and harrowing in, at one shilling <i>per</i> acre | 2         | 5         | 0         |
| Reaping, at five shillings <i>per</i> acre - - - - -       | 11        | 5         | 0         |
|                                                            | <hr/>     |           |           |
| Total expence on forty-five acres drilled -                | 135       | 0         | 0         |
|                                                            | <hr/>     |           |           |

*Produce of forty-five Drilled Acres.*

|                                                                                                   |       |   |   |
|---------------------------------------------------------------------------------------------------|-------|---|---|
| Forty-five acres give four hundred and fifty bushels, which, at four shillings <i>per</i> bushel, |       |   |   |
| are - - - - -                                                                                     | 90    | 0 | 0 |
| The straw of this crop - - - - -                                                                  | 30    | 0 | 0 |
|                                                                                                   | <hr/> |   |   |
| Total produce of forty-five acres of drilled wheat                                                | 120   | 0 | 0 |
|                                                                                                   | <hr/> |   |   |

|                         |       |   |   |
|-------------------------|-------|---|---|
| Now take from - - - - - | 135   | 0 | 0 |
|                         | 120   | 0 | 0 |
|                         | <hr/> |   |   |

|                                                            |       |   |   |
|------------------------------------------------------------|-------|---|---|
| And the remainder shews, that Farmer <i>D.</i> <i>!ses</i> |       |   |   |
| annually, by his forty-five drilled acres -                | 15    | 0 | 0 |
|                                                            | <hr/> |   |   |

From

|                                            | <i>l.</i> | <i>s.</i> | <i>d.</i> |
|--------------------------------------------|-----------|-----------|-----------|
| From Farmer <i>A.</i> 's produce - - - - - | 138       | 0         | 0         |
| Take his expence - - - - -                 | 83        | 14        | 0         |

The remainder shews, that Farmer *A.* gains fifty-four pounds six shillings by forty-five acres, in the common course of husbandry - - - 54 6 0

The advantage consequently is, on the side of the common husbandry, against drilling, on forty-five acres, annually - - - - - 54 6 0  
15 0 0  

---

69 6 0

But it may be said, and with truth too, Farmer *A.* charges nothing for manure; which he cannot avoid using, when he fallows for wheat:—or, if he does omit the use of it, he will not have the crops here supposed. This is a charge upon him, which is not upon Farmer *D.* For he, by constant ploughing, can get his crop without manure. This article must, therefore, be valued: and the amount of it, deducted from the profit of the common husbandry.

In order to this, it is allowed, that twelve loads of dung must be laid upon every one of the nine acres fallowed for wheat. The value of a load of dung may fairly be put at five shillings: consequently twelve loads at three pounds: and, as the manure on an acre is worth three pounds, that, on nine acres, will be worth twenty-seven pounds. This sum being deducted from the profits of the common farmer, the advantage of his method, above that of drilling, will be twenty-seven pounds less than before stated, *viz.*

69 6 0  
27 0 0  

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On forty-five acres annually - - - - - 42 6 0

And



And this annual difference, in the net profits, arising from these two different methods, seems a decisive proof, that the method of culture by drilling is hurtful to the farmer \*, who practises it; as lessening his profit: and, to

\* As the question above stated, relating to the comparison of the drill and broad-cast methods, is so highly important, and embarrassed with so much doubt, it is very material to inquire in what the doubt seems to lie: as the only means of clearing it up is, to reduce the dispute to some stated points of difference, to be determined, as far as it depends on facts, by future experiments.

In examining the matter in this light, we shall soon find, that the great and essential difference betwixt Mr. Baker, and the worthy writer of this letter, consists in this particular, that Mr. Baker has presumed, *land, cultivated by the drill method, will produce at least equally good crops, for a succession of fifteen years or more*; and our present correspondent, on the contrary, *denies this*; and founds his calculation, and deductions, on the *opposite supposition*. It must be allowed, indeed, that the two gentlemen proceed on different systems of the broad-cast tillage: Mr. Baker taking an alternation of wheat, and oats, with a third year's fallow; and the other taking the succession of tilth-wheat, oats, clover, and lay-wheat, with a fifth year's fallow: which is, most probably, a more profitable mode. This makes a difference in the particular articles of expence and produce. But it will appear, on close examination, the essential difference resides in the allowing, or disallowing, that the produce, or crops, in the drill culture, will not fail after the first year; but may be rated as the same for a long term.

In this particular the two accounts are intirely opposite. Mr. Baker states, in his account, the produce of a drilled acre of wheat, at six barrels *per* year, for fifteen successive years: and says, in the postscript of his letter, "For the encouragement of such of your readers, as are willing to enter into the drill husbandry, I cannot omit to inform you, that I now have a field under wheat in drill, which surpasses any corn I ever saw in my life, at this season: and it is the third drilled crop, which has been upon the ground in succession." Our present correspondent, on the contrary, here says, "That the first crop, though not quite equal to the sanguine expectations of the driller, is pretty good: and he sows again with the notion, that this is to be increased next year, by the melioration of soil, which he has read is the certain effect of this method of culture. Unluckily his second crop is worse than the first: and the successive crops prove, that notwithstanding the virtue of the horse-plough, the

to the public, as lessening the produce of the land; and consequently raising the price of all provisions.

I am sensible, that the detail, which the comparison of the two methods of culture has drawn me into, will appear minute to those who read for mere amusement. But I do not write to them: but to those, who want information,—and to convey this, I apprehend, I cannot treat the subject too minutely.—For the knowledge of any thing can be acquired only by the knowledge of the minute parts of it.

I could give some tolerable reasons, why drilling wheat, (for to this grain I confine my present argument) does not answer in the manner, in which the writers on this new system flatter us it will: but having been too long already, I content myself at present with having proved, that in fact it does not answer.

“the land is advancing to the state, that is diametrically opposite to that of *melioration*.”

He afterwards says, he has tried this method four years; and verifies, by the specified produce, the truth of the position.

It appears, therefore, that the great difference in the state of facts, betwixt Mr. Baker, and our present correspondent, is in this particular *of the crops continuing to be the same in the drill culture for a long succession of years: or failing after the first year.* This, consequently, makes the fundamental question, that remains to be decided by further experiments. For neither of these accounts, ought to be questioned, with respect to the veracity of the relators: nor do indeed reflect any improbability on each other: as both are only narratives of single trials, for a small number of years; and nothing is more common than to have variations of this kind, from many contingent circumstances of soil, season, and management, not sufficiently observable to strike the attention, so as to gain a place in the relation. It is perhaps a lucky circumstance for the clearing up this matter, that these two accounts, so seemingly extraordinary, happen to come both to our hands at almost the same time: as we hope it will incite such trials, observations, and communications, relative to this point, as will be fully satisfactory; and either establish the practice of drilling; or evince its unprofitableness; and turn that application, which is now bestowed on it, by the zealous improvers of agriculture, to more successful pursuits. N. O.



I must, however, before I conclude, touch on one matter, which seems of great consequence to the improvement of agriculture in this kingdom: I see, by the public papers, that the Society of Arts, &c. annually give premiums, some honorary, some lucrative, to those, who excell in different branches of agriculture. To one, for the best method of cultivating wheat; to another, for the best method of cultivating barley: and so on. A very laudable practice, undoubtedly; and worthy of that patriotic Society.

But I cannot help observing, that the benevolent intentions of the Society do not produce, in this instance, one thousandth part of the good, which they would do, for want of the *publication* of these excellent methods. Were such a publication made, either in your work, or in any other way, which the Society may like better, the improvement made by a gentleman in Yorkshire, would reach to every part of the kingdom; whereas, by not being published, the benefit of these improvements is confined to a circle of a few miles round the spot, where they are made.

This evil is so inconsistent with the views of the Society \*, that I cannot doubt, they will readily consent to the plain remedy; *viz.* the publication of these improved methods, in any branch of agriculture, which they deem

\* It would, undoubtedly, contribute greatly to the rendering the views of the Society effectual, that all these accounts should be published at large in our collection: as being the only work, at present on foot, proper to receive them. In default of that, there remains no method; but to insert them in some news-paper: which, besides the not answering the end, may seem disagreeable to gentlemen, as far as regards the signature of their name: a matter nevertheless of consequence to stamp the authenticity and credit, that may give them their fullest influence. As to ourselves, our regard to the Society, as well as the public, will dispose us to receive with pleasure all such pieces, whenever the gentleman, in whose disposal they are, will favour us with them: and certainly every member of the Society, who is actuated by the true spirit of its institution, must approve of such a step: as both the credit of the Society itself, and the end of the premium, cannot fail to be promoted by it. E. O.

worthy of being honoured or rewarded: nor can I imagine, that the gentlemen, who have made these improvements, and delivered in their accounts of them, would hesitate, or make the least objection against furnishing you with copies of them, to be laid before the public. Sure I am, that the advancement of agriculture can never be promoted to a considerable degree, by any best-improved methods, of executing any part of it, while those methods, are unpublished. In this state, they are a light hidden under a bushel. The farmers are much obliged \* to you, and Mr. Baldwin, for the account of his burnet-grass. That gentleman would oblige them still more, if he would take the trouble of informing them, by what manure, and what tillage, he prepared his ground for this grass: and what sort of produce his *sown* burnet gives this year. For, as to transplanting grass, our labourers in the country can never be persuaded to go about it: and when they would finish a field of it, is hard to guess. But we should be thankful for this grass in spring, if it can be raised by field-culture; that is, by sowing it; and harrowing it in.

I am, GENTLEMEN,

May 9, 1766.

Your obedient servant,

INGLORIUS.

P. S. Before I make up this packet, I will add;

1st. With regard to the price of ploughing above stated, viz. ten shillings *per* acre, that, I am very clear, my own ploughing costs me as much: and, moreover, that every farmer's team must gain him so much a day, *in that part of the year, in which this work is chiefly to be done*; if he is

\* We presume, from some reasonable ground of conjecture, not however from information, or any authority from him, that Mr. Baldwin's account of burnet, though very interesting, is but a small part of the obligation of this kind, which the public has to him. We agree intirely with Inglorius, in his notion of the utility of this request, of a more minute account of the culture; as the experience is of a later date than the publication of Mr. Rocque's pamphlet; and, doubtless, may have furnished some lights of the management of this plant, that may accommodate it still more to the purposes of farmers.



to be paid for it what it costs him. But, to cut off any objection from this circumstance, I will suppose ploughing an acre costs but six shillings. On this supposition, the article of ploughing, in the forty-five drilled acres, will be reduced from 90*l.* to 54*l.* For 10*s.* : 90*l.* :: 6*s.* : 54*l.* And the article of ploughing, in the forty-five acres, managed by common-husbandry, will be reduced, from 31*l.* 10*s.* to 18*l.* 18*s.* For 10*s.* : 31*l.* 10*s.* :: 6*s.* : 18*l.* 18*s.*

Thus the expence, on forty-five drilled acres, *l. s. d.*

is reduced from - - - - - 90 0 0

To - - - - - 54 0 0

And the saving is - 36 0 0

And the expence, on the other forty-five acres,

is reduced from - - - - - 31 10 0

To - - - - - 18 18 0

And the saving here is only - 12 12 0

There is, therefore, a greater saving in the drilled

method - - - - - 36 0 0

compared with the other - 12 0 0

by - 23 8 0

Now, if from the difference of the profits of the

two methods stated above, *viz.* - - - - - 42 6 0

We deduct this difference arising from changing

the price of ploughing, in favour of the drilling

method, *viz.* - - - - - 23 8 0

The remainder shews the difference - - - - - 18 18 0

*still* remaining between the *annual* profits of the two methods : which, though considerably reduced, by this supposition, is yet fully sufficient to convince us, which of the methods is best worth practising.

2. I would observe, that as the crops, stated above, are truly stated from actual experience on my land, a supposition of better soil will not operate in favour of drilling. For the other crops will be proportionably increased with

the drilled crop. But the supposition of a worse soil will operate against the driller, more than against the common farmer. For a very poor soil may do something with manure; but can do very little indeed without it: and this the driller does not use.

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N U M B E R L I.

*An Account of the Nature, and Use of the Nonsuch or Hop Trefoil; and of the Manner in which it is cultivated in Suffex.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

SINCE none of my southern neighbours have given themselves the trouble of satisfying the laudable inquisitiveness of some of your correspondents, relating to the culture and use of the *strawberry trefoil*; in return for the pleasure and improvement, I have received from many of them, I offer this for your and their service. I always thought your plan a very useful one, as being a means of communicating the knowledge of experiments and improvements to the public: and some late imperfect hints \* on the *strawberry trefoil*, among other things, confirm my

\* The *strawberry trefoil* is a plant not generally known; and, as it appears, is very likely to be confounded with other trefoils, particularly the *hop trefoil*. There has been, undoubtedly, among our correspondents, some mistakes of this kind. It is not indeed to be wondered at, for Gerard Parkinson, and the former writers, who were frequently very indistinct in such matters, calling different plants by these names, and considered them all as exoticks, and particularly so in this. Mechanicus, who seems not to have had any lights in these points, but his own conjectures, has supposed the *hop trefoil*, and *strawberry trefoils*, to be the same: and ingeniously accounts for the two names, from the appearances of the plant. But there are two very different species of trefoil distinguished at present by these names of *hop* and *strawberry*: and the kind which Mechanicus has collected, is



my opinion of the utility of your work: as it affords an opportunity for any person to publish the cultivation of a plant, so little known, as that seems to be in many parts of this kingdom. I conclude, the Rev. Mr. Comber believes it to be cultivated: else he would scarce have desired *further* information on that head. But it is clear, it is not cultivated in Ireland: else Mr. Wynne Baker must have known it. And Mechanicus, in your last Number, calls it a very extraordinary, and little-noticed plant: and puts himself to the trouble of beginning its cultivation, by collecting a single ounce of seed from wild plants of the same sort. From some other circumstances, likewise, I am inclined to think, its cultivation is confined to the south part of the island: and, for ought I know, to but a small part of the south. Be that as it may, I am now to inform you, that it has been cultivated in Suffex, particularly on or about the South Downes, for upwards of forty years past.

In what particular spot it began to be cultivated, I cannot tell: but the fact is, that, for many years past, many hundred acres, I may say many thousand acres of it, are sowed every year: and as many bushels of seed saved. You may imagine, therefore, it seemed as surprizing to me, and so it must to all my neighbours, to hear of an in-

is certainly the *hop trefoil*, and not the strawberry: and it is a confirmation of it, that there is so much agreement betwixt this and the Suffex *nonfuch*, as induces Mr. Davies to say here, that his description of it is right. For the nonfuch is the hop trefoil, and not the strawberry: and so Mr. Miller has very properly made it. This is not the plant, therefore, inquired after, and described, by Mr. Baker, which is certainly the strawberry trefoil. But it is, nevertheless, a very useful plant, as Mr. Davies's account proves; though one not known in general: and, therefore, the mistake is perhaps productive of a more important information to the public, than could have resulted from the most minute intelligence, with respect to the original object of inquiry: as it has occasioned Mr. Davies to give this very clear, satisfactory, and interesting detail of the nature and uses of the *nonfuch*; and that manner of cultivation of it, which long experience has shewn to be profitable in his neighbourhood. R.

quisitive

quisitive gentleman's collecting an ounce of this seed for experiment sake, as it would to him, had I offered to procure him a ton or two of the same seed, while he was gathering his ounce. I am far from meaning, to depreciate the merits of Mechanicus, or any other person, in making trials in husbandry, of articles uncultivated hitherto: but am only arguing, from a fact, the necessity of having a means proper to communicate observations already made from one corner of the kingdom to the other. By such means, the inquisitive and ingenious will be directed in the choice of subjects for observation: and, by such means, others will be benefited by them. But to the point.

I believe Mechanicus is right, as to the description of this plant: though Miller distinguishes between the hop\* and strawberry trefoil; perhaps owing to different authors

\* Mr. Miller's accounts of these two plants is very just, and agreeable to the present distinction and use of these names. In order, therefore, that those of our future correspondents, who may not be accurate botanists, may be intelligible to each other, on this subject, we have given them here.

Of the hop trefoil, Mr. Miller mentions two kinds. The first of these, which he has made number 3, of the *trifoliums*, he calls, "*Trifolium spicis ovalibus imbricatis, vexillis deflexis persistentibus, calycibus nudis, caule erecto. Flor. Suec. 617.* Trefoil with oval imbricated spikes of flowers, having deflexed permanent standards, naked empalements, and an erect stalk. This is the "*Trifolium pratense luteum, capitulo lupuli vel agrarium. C. B. P.* Yellow Meadow Trefoil, or Hop Clover." The second kind, which is his number 4, he calls, "*Trifolium spicis imbricatis, vexillis deflexis persistentibus, calycibus pedicellatis, caulibus procumbentibus. Lin. Sp. Plant. 773.* Trefoil with imbricated spikes of flowers, having deflexed permanent standards, empalements standing upon foot-stalks, and trailing stalks. This is the "*Trifolium luteum, lupulinum, minimum. Hist. Ox. 2. 142.* The least Yellow Hop Trefoil, called Nonsuch, or Blackseed." His further account of them is, "The first sort grows naturally among the grasses, in most of the upland pastures in this country; but the seeds are frequently sold in the shops by the title of Hop Clover: and are, by many people, mixed with the other sorts of clover, and grass seeds, for laying down ground to pasture: this grows with upright branching stalks, about a foot high; which are garnished with trifoliate leaves,



thors seeing the same plant on different soils. The name, by which this plant is known to our farmers is *Nonfuch*. And

“ leaves, whose lobes are oblong, and heart-shaped, but reversed: the narrow point joining the foot stalks. The flowers grow from the wings of the stalk upon long foot-stalks. They are collected into oval imbricated heads; they are yellow, and have naked empalements, lying over each other, like scales, somewhat like the flowers of hops, from whence this plant had the title of hop-clover. But there are two sorts of this, which grow naturally in *England*. The other, (*which is the number 4, of his trifoliums*,) is a much smaller plant than this, and has trailing stalks. The heads of the flowers are smaller; and the flowers are of a deeper yellow colour. These are not abiding plants, so are by no means to be sown, where the ground is designed to continue in pasture; but, in such places, where one or two crops only are taken, and the land is ploughed again for corn, it may do well enough when it is mixed with other seeds, though the cattle are not very fond of it green, unless when it is very young. The large sort is the most profitable, but this is rarely to be had without a mixture of the small kind; and also of the smaller melilot. It is commonly called *Nonfuch*, or sometimes *Black-seeds*. For those, who save the seeds for sale, are seldom curious enough to distinguish the sorts; but where the beauty of the verdure is considered, there must not be any of the seeds sown, because their yellow heads of flowers are very unsightly among grass; and if it is in gardens, where the grass is constantly mowed, the flowers of these plants will come out, near the root, in such clusters, as to occasion large unsightly yellow patches; and as the heads decay, they turn brown, and have a very disagreeable appearance.”

The *strawberry trefoil* is the number 10, of his *trifoliums*, and called by him, “ *Trifolium capitulis subrotundis, calycibus infatis bidentatis reflexis, caulibus repentibus*. Hort. Cliff. 373. Trefoil with roundish heads, reflexed bladder empalements with two teeth, and a creeping stalk. This is the *Trifolium fragiferum friseum*. C. B. P. 329. Strawberry trefoil.” His further account is, “ That it grows naturally on arable land in many parts of *England*; and has trailing stalks which put out roots at their joints. The leaves stand upon long slender foot stalks; the lobes are roundish, and sawed on their edges. The flowers are collected in roundish heads, standing upon slender foot-stalks, which rise from the wings of the stalks. These have bladder empalements, which terminate in two teeth. When these lye on the ground, their globular heads,

“ having

And it is cultivated, either with a view to save its seed for sale ; or, in order to be mowed green for hay. In both cases, we sow it in the spring with oats, or barley, in the *broad-cast* way ; just as we do clover.

“ having a little blush of red on their upper side toward the sun, “ and their other part being white, they have a great resemblance of strawberries, and from thence it was titled strawberry trefoil.” He observes of this kind, and some of the others “ that they are preserved in gardens for variety.”

Mr. North also, in his pamphlet on grasses, speaks of the *hop trefoil* as a cultivated plant in this manner. “ The fifth sort “ of trefoil which is biennial, or lives but two years, produces “ small heads of yellow flowers. It goes by the names of *trefoil*, *nonfuch*, *black-seed*, and *hop clover*. The seeds are “ yellow, but covered with black husks : which is the reason “ for calling it black-seed, and the heads, before the husks “ change black, are something like hops. This grass will “ thrive in most kinds of soil, makes good early pasture, and, “ when cut in full bloom, excellent hay. It is sown in the “ spring, upon corn harrowed, and rolled over as is directed “ for broad clover. Twelve or fourteen pounds of clean seed, “ is sufficient for an acre : but if it is sown in the hulls, a bushel and a half or two bushels should be allowed. When this “ grass is designed for seed, it must be mown for hay not pastured in the spring, as is the method with broad-clover.”

It is evident from hence, that the hop trefoil, and the strawberry, are different species of plants, and that the hop trefoil, is the kind collected by Mechanicus ; and cultivated in Suffex, under the name of the *nonfuch*, according to Mr. Davies's very just and particular account.

It is equally evident also, that the plant, which Mr. Wynne Baker made his observations on, is the *strawberry trefoil* ; and that, as far as appears, it has not been hitherto cultivated as a grass, for feeding cattle. Whether this neglect of it, has proceeded from its being unattended to, by the improvers of husbandry in this way ; from its not appearing to be profitable, on trials which may have been made ; or from the difficulty of procuring a sufficient quantity of seed, to admit of adequate experiments ; we cannot take upon us to conjecture : but, from what Mr. Baker has observed of it, in his limited attempt to cultivate it, there seems a very sufficient ground of presumption in its favour, to declare that it merits a further examination. For it is certain nothing is of more importance to the improvement of pasturage, the present great national object, when the high price of flesh meat is considered, than a minute and extensive knowledge of the dispositions and qualities of all those herbs, which can be substitutes for grass. E. O.

When



When we mean to save seed from a piece of nonsuch, we sow about half a bushel of clean seed, on an acre; and, after the corn is mowed, we generally feed it with sheep in the autumn. But it must not be eat in too late, nor too close; for fear of injuring the plants, which are often killed by this means. In July following, the seed will be ripe: which is known by the husk, that contains the seeds, being black. It must not be suffered to grow too ripe: for, in that case, as well as after much rain, the seed will be very apt to shed. In such a case, it is sometimes thrashed in the field, on a sheet; and carried in, separated from the haulm.

The ground is afterwards immediately broken up, and fallowed for wheat: as the nonsuch will grow no more that year: nor yield any profitable crop, if suffered to grow the next year. For which reason, it is never sowed but for the sake of one crop.

I scarcely need to observe, that there is no difference required, in the manner of its cultivation, when it is intended to be mowed for hay. It must be cut about the beginning of June, when it is in full bloom; and the seed has been formed on the stalks that bloomed first; that is, on those nearer the ground. For nonsuch keeps on blowing, in different parts of the stalks, for a long while. It begins to blow about the latter end of April; and, as the stalk grows taller, it shoots out into branches; which keep on blowing, after the seed is formed, in those that blew first. It is observed, that if it be cut too soon, though it will to appearance make very fine hay, cattle will not eat it, unless compelled by hunger: whereas, when it is cut in its proper time and maturity, and well made, cattle, even those that are fatted, will eat it as readily, and do as well with it, as with any hay that is produced. And many of our Sussex oxen, which are, I believe sold for as much *per* stone as any that come to Smithfield, and for more than most of them, are fed either in part, or entirely with this hay.

There is another method, in which we cultivate non-such, and which is, indeed, the most common, when it is intended for hay and pasture. This method is, to sow it, mixed with clover seed, of each an equal quantity; that is, about a peck of each to the acre. We find it best, not to be sparing of seed: for the thicker the plants are on the ground, the smaller the stalks, and the finer the hay will be: consequently the more valuable. The stalks of non-such, being much finer than clover, still mend the hay on that principle also: which is one reason for mixing them. Another very material reason for sowing these two seeds mixed, is, that, as the non-such does not grow again, when they have been mowed together for hay in June, the clover immediately after starts up for a second crop: which we save for seed, and mow about Michaelmas. The non-such, not growing then, leaves double room for the clover to grow, and ripen its seed; which it does the better, for not being too thick upon the ground.

We find it useful, also, when we sow any saintfoin, to throw in about a gallon of non-such seed, into the ground along with that seed. By which means, we have a good crop of hay the first year: which is never to be expected, when saintfoin is sown alone. And the non-such not growing after it is once mowed, leaves room for the saintfoin to branch out, and fill the ground, both for the after grass, and for the succeeding crops.

The quantity of hay, non-such produces, is much the same, as that of clover: but it generally produces more seed. The price of the seed is commonly one-third less than that of clover seed, or thereabouts. I mean, that of clean seed, cleared of the black husk, or *pug*, as we call it. It looks like clover seed: but is of a yellower hue, and is of the same size. Sometimes it is sowed in the pug: and then four times the quantity must be used. For four bushels of seed in the pug will generally yield one bushel of clean seed.

The seed is cleared of its pug, by thrashing it, with flails, on a barn-floor; in the same manner, as clover seed



seed is cleansed. It may be done, also, by a mill. The common price for cleaning seed, to our labourers, is about five shillings a bushel.

Leaving you at liberty, as to the use you shall make of this account, I remain,

GENTLEMEN,

Glynd, near Lewes,  
May 10, 1766.

Your's, &c.  
THO. DAVIES.

P. S. If I have omitted any thing, which Mr. Comber, or any other of your readers, may want to know, relating to this plant, or any other subject of cultivation within my knowledge, I shall be ready at any time to satisfy them to the best of my power. Though I am not a farmer by profession, yet, as I live much among several intelligent farmers, and use a little land myself for health and pleasure's sake, I am pretty well acquainted with the general practice of farming in this part of the country.

## NUMBER LII.

*A List of the Premiums offered for the Year 1766, by the Society for the Encouragement of Arts, Manufactures, and Commerce.*

*Premiums for Planting and Husbandry.*

### A C O R N S.

1. **F**OR setting or sowing the greatest quantity of land with acorns (twenty acres at least) between the twentieth of September 1765, and the first of May 1766, and for fencing and preserving the same effectually, in order to raise timber; a gold medal.

Certificates of setting or sowing, agreeable to the above conditions (and that there are five hundred oak plants at least on each acre) must be delivered to the Society on or before the first Tuesday in November 1766.

Y y 2

2. For

2. For the second greatest quantity of land, set or sown with acorns (not less than fifteen acres) agreeable to the above conditions; a silver medal.

3. For the third (not less than ten acres) a silver medal.

4, 5, 6. The like premiums, and on the same conditions, will be given for setting or sowing acorns between the twentieth of September 1766, and the first of May 1767.

Certificates to be delivered on or before the first Tuesday in November 1767.

**CHESNUTS.** 7. For setting or sowing the greatest quantity of land with Spanish chesnuts (for raising timber) not less than six acres, before the first day of May 1766, and for effectually fencing and preserving the same; a gold medal.

8. For the second greatest quantity (not less than four acres) a silver medal.

9. For the third greatest quantity (not less than two acres) a silver medal.

Certificates of having set or sown, agreeable to the above conditions (and that there are five hundred Spanish chesnut plants at least on each acre) must be delivered to the Society on or before the first Tuesday in November 1766.

10, 11, 12. The like premiums, and on the same conditions, will be given for setting or sowing Spanish chesnuts before the first of May 1767.

Certificates of setting or sowing, agreeable to the above conditions (and that there are five hundred Spanish chesnut plants at least on each acre) must be delivered to the Society on or before the first Tuesday in November 1767.

**ELM.** 13. For properly planting the greatest number of the small-leaved English elm, for raising timber (commonly used for keels of ships and water-works) not less than one thousand, before the first day of May 1766, and for effectually fencing and preserving the same; a gold medal.

14. For the second greatest number, in like manner, a silver medal.

15. For the third, a silver medal.

Certificates



Certificates of having planted, agreeable to the above-mentioned articles, must be delivered to the Society on or before the first Tuesday in November 1766.

16, 17, 18. The like premiums, and on the same conditions, will be given for properly planting the small-leaved English elm, betwixt the twenty-fourth of June 1766, and the twenty-fourth of June 1767.

Certificates to be delivered on or before the first Tuesday in November 1767.

FIR. 19. For planting out in the year 1766, at proper distances, the greatest number of that pine, commonly called the Scotch fir, (being the tree which produces the best red or yellow deal) not less than twenty thousand; to be two years old at least when planted out; and for effectually fencing and preserving the same; a gold medal.

20. For the second greatest number, not less than ten thousand, in like manner, a silver medal.

21. For the third greatest number, not less than ten thousand, a silver medal.

Certificates of such planting must be delivered on or before the last Tuesday in January 1767. To be specified in the certificates at what distances they have planted them.

N. B. Not less than one acre to be planted in any one inclosure, and they must be planted not nearer to each other than four feet.

22, 23, 24. For planting out from the twenty-fourth of June 1767, to the twenty-fourth of June 1768, at the distance of four feet apart, the greatest number of that pine, commonly called the Scotch fir, (being the tree which produces the best red or yellow deal) not less than twenty thousand; to be two years old at least when planted out; and for effectually fencing and preserving the same; a gold medal.

For the second greatest number, not less than ten thousand, in like manner, a silver medal.

For the third greatest number, not less than ten thousand, a silver medal.

Certificates of planting, according to the above conditions, the state of the plants at Michaelmas preceding the date of the certificates, to be delivered on or before the last Tuesday in December 1768.

N. B. Not less than one acre to be planted in any one inclosure.

WEYMOUTH PINE. 25. For planting out in the year 1766, at proper distances, the greatest number of white pine, commonly called Lord Weymouth's Pine, or the New-England Pine, (being the properest sort for masts) not less than two thousand, to be four years old at least when planted out, and for effectually fencing and preserving the same; a gold medal.

26. For the second greatest number, a silver medal.

27. For the third greatest number, a silver medal.

Certificates of such planting must be delivered on or before the last Tuesday in January 1767.

28, 29, 30, 31, 32, 33. The like premiums will be given for planting out Lord Weymouth's Pine as above, in the year 1767. Certificates thereof must be delivered on or before the last Tuesday in January 1768.

LUCERNE. 34. For sowing or planting with lucerne, the greatest number of acres (ten at least) upon ground well cultivated, and for keeping the same free from weeds for three years; and giving an account of the culture, soil, annual produce, and its effects on cattle fed with it; twenty pounds.

35. For the next greatest number, fifteen pounds.

36. For the next, ten pounds.

The certificates to be produced on or before the second Wednesday in December 1767.

37, 38, 39. For sowing or planting with lucerne the greatest number of acres (ten at least) upon ground well cultivated, and for keeping the same free from weeds; and giving an account of the culture, soil, annual produce, and its effects on cattle fed with it; twenty pounds.

For the next greatest number (eight acres at least) fifteen pounds.

For



For the next (six acres at least) ten pounds.

The certificates to be produced on or before the second Wednesday in December 1768.

**CARROTS.** 40. For sowing the greatest number of acres (not less than ten) with carrots, for the feeding of cattle only; giving an account of the soil, culture, time of taking up, produce, and their effects on cattle fed with them; twenty pounds.

41. For the next greatest number, (not less than eight) fifteen pounds.

42. For the next, (not less than six) ten pounds.

The certificates to be produced on or before the first Tuesday in November 1766.

**PARSNIPS.** 43. For sowing the greatest quantity of land, (not less than ten acres) with parsnips, for the feeding of cattle only; giving an account of the soil, culture, produce, and their effects on cattle fed with them; twenty pounds.

44. For the next greatest quantity of land, (not less than eight acres) fifteen pounds.

45. For the third greatest quantity of land, (not less than six acres) ten pounds.

The certificates to be produced on or before the first Tuesday in November 1766.

46. For sowing in the year 1767, the greatest quantity of land, (not less than ten acres) with parsnips, for the feeding of cattle only; giving an account of the soil, culture, produce, and their effects on cattle fed with them; twenty pounds.

47. For the next greatest quantity of land, (not less than six acres) ten pounds.

The certificates to be produced on or before the first Tuesday in November 1768.

N. B. The accounts of the soil, culture, &c. to be at the disposal of the Society.

**PARSLEY.** 48. For sowing the greatest quantity of land, (not less than four acres) with parsley, for the feeding of sheep only; giving an account of the soil, culture, produce, and its effects on the sheep fed with it; twenty pounds.

49. For

49. For the next greatest quantity of land, (not less than three acres) fifteen pounds.

50. For the third ditto, (not less than two acres) ten pounds.

The certificates to be produced on or before the last Wednesday in February 1767.

51. For sowing in the year 1767, the greatest quantity of land, (not less than ten acres) with parsley, for the feeding of cattle only; giving an account of the soil, culture, produce, and its effects on cattle fed with it; twenty pounds.

52. For the next greatest quantity of land, (not less than six acres) ten pounds.

The certificates to be produced on or before the first Tuesday in November 1768.

N. B. The accounts of the soil, culture, &c. to be at the disposal of the Society.

BURNET. 53. For sowing or planting with burnet the greatest number of acres, (not less than ten) upon ground well cultivated, and for keeping the same free from weeds for two years; and giving an account of the culture, soil, annual produce, and its effects on cattle fed with it; twenty pounds.

54. For the next greatest number of acres, (not less than eight) fifteen pounds.

55. For the next greatest number of acres, (not less than six) ten pounds.

The certificates to be produced on or before the first Tuesday in December 1768.

N. B. All persons intending to cultivate burnet, may be supplied with the seed, and receive instructions \* for the culture of it, from Mr. Rocque, of Walham-Green, near Fulham.

\* Several accounts of the culture and uses of burnet, may be found in various parts of our collection: but the most satisfactory and late communication is Mr. Baldwin's letter on this subject to the Society for promoting arts, inserted in No. 31. Vol. VI. page 259.



56. In order to promote the trials of burnet in every way, the following premiums will be given for sowing or planting with burnet, keeping the same clear from weeds for two years, the greatest quantity of land, of the least \* reputed value; such quantity being not less than ten acres; giving an account of the culture, nature of the soil, rent of the land, annual produce, and effects of the burnet in feeding cattle; twenty pounds.

57. For the next greatest number of acres, (not less than eight) fifteen pounds.

58. For the next greatest number of acres, (not less than six) ten pounds.

The certificates to be produced on or before the first Tuesday in December 1769.

#### GRASS SEEDS GATHERED BY HAND.

59. For the greatest quantities respectively of each of the following kinds of grass seeds, *viz.*

Meadow Fescue,  
Meadow Foxtail,  
Yellow Oat,  
Common Poa,  
Annual Poa,  
Vernal,  
Fine Bent,  
Sheeps Fescue,  
Crested Dog's-tail,

gathered clean from the fields by hand, when ripe, in the year 1766, or produced, and clean saved from such seeds gathered in the year 1765, as shall be separately sown in

\* It appears, that burnet will yield a greater crop, on dry shaley land, than any other herb hitherto cultivated in the view of a grass. Its great utility seems to depend in a principal degree on this quality. The Society, having procured sufficient trials of it, in a general way, have, therefore, judiciously made this attempt to ascertain, what the degree of advantage may be, that will arise from the cultivating it on the cheapest and worst kind of land. A pursuit, which seems pregnant with very great benefit to the public, in the present circumstances, as to the price of butchers meat, and provisions in general. O. E.

drills, and kept clean from all mixtures of other grasses and weeds; ten pounds.

Certificates of such separate sowing in drills and weeding, together with certificates under the hands of the minister and churchwardens, or of two or more of the principal inhabitants of the parish, ascertaining the quantities gathered; together with a small sample of each kind of seed, certified as above to have been taken indifferently and unpicked out of the gross quantity gathered, with a few plants of each kind of grass having the seed upon them as it grew; to be produced to the Society on or before the first of December 1766.

60. For the second greatest quantity, five pounds.

Specimens of the grasses \* in seed are to be seen at the Society's room in the Strand; and drawings of them in Mr. Stillingfleet's Miscellaneous Tracts, and in Mr. Mill's third Volume of Husbandry.

61. For the greatest quantity of land, (not less than one acre) which shall be sown with any one of the above-mentioned sorts of grass-seeds unmixed, in the year 1767, the Society will give a premium of twenty pounds for each quantity of land so sown, the sowing to be in drills for the convenience of keeping the grass from weeds.

Certificates signed as above, ascertaining the quantity of the land sown, the quality of the soil, that the seed was sown in drills, and clean hoed and weeded; to be produced to the Society on or before the first of December 1767.

N. B. The Society will be ready to purchase such clean seeds of the above grasses as shall be brought to them between the first day of August and the first day of December, in the year 1767, at prices to be ascertained in their publications for that year, and will distribute the same *gratis*, among such members of the Society as shall give

\* Descriptions and accounts of these grasses, will be found in No. 35. Vol. V. page 173, of this work: and prints of them are given in No. 73. Vol. IV. page 318. E. O.



in their names to the secretary between the first day of January and the first day of March, in the year 1768.

**CULTIVATING OF WHEAT, &c.** 62. It not being yet ascertained by sufficient trials, whether sowing in broad-cast \* or in drills, horse-hoeing the intervals, be the most proper method of cultivating wheat, the Society will give to the person who shall produce the most accurate account of experiments, with the success in each method, and a description of the soil in which each experiment has been made; a gold medal.

63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74. The like premium will be given for the like account of experiments on each of the following articles, respectively, viz. Rye, Oats, Barley †, Lucerne, Saintfoin, Carrots, Parsnips, Parsley, Turneps, Beans, Peas, and Tares or Vetches.

The candidates must deliver in their accounts on or before the first Tuesday in December 1767.

**N. B.** The Society expects that the places shall be specified where such experiments were made; and that the experiment in the broad-cast, and in the horse-hoeing method, be in the same kind of soil, and as contiguous as may be.

The premiums for the above-mentioned articles, are extended to Scotland and Ireland, and also to the British colonies on the continent of North America.

**MADDER.** 75. The Society do hereby certify, that they will give the sum of five pounds for every acre of land planted with madder, as far as one hundred acres, in England or

\* An account of the comparative advantages of the drill and broad-cast methods of cultivating, given by Mr. Wynne Baker to the Dublin Society, is to be found in page 280 of this Volume. Another very distinct account of the result of experiments on the same subject is inserted above, page 319, of this number. E.

† Accounts of the drill-culture of barley and lucern, may be seen in Mr. Baker's report, Vol. V. No. 52. page 257, of our *Museum*. The account of the drill and broad-cast method of cultivating lucerne, for which the last year's premium was given by the London Society, is inserted in *Museum* for last March, No. 25. page 170. E. O.

Wales; but in case there should be claimants for more than one hundred acres, then the sum of five hundred pounds to be divided among the claimants, in proportion for every acre of each respective claimant. It is required that the plants be of the growth of England or Wales, and that no less than twenty thousand plants be set on every acre. The time appointed for the planting of the sets, is to be from the 31st of March 1765, to the 31st of March 1766. Proper certificates of all these conditions are to be sent to, and received by the secretary of the Society, on or before the first Tuesday in November 1766 inclusive; after which day no certificates or claimants will be allowed of.

N. B. Receipts of the purchase of the plants, if not of their own growth, as well as the above-mentioned certificates, are to be produced.

76. The Society do hereby certify, that they will give the sum of five pounds for every acre of land planted with madder, as far as one hundred acres, in England or Wales; but in case there should be claimants for more than one hundred acres, then the sum of five hundred pounds to be divided amongst the claimants, in proportion for every acre of each respective claimant, not less than twenty thousand plants to be set in every acre. The time appointed for the planting of the sets is to be from the 31st of March 1766, to the 30th day of April 1767. Proper certificates of those conditions are to be sent to, and received by the secretary of the Society, on or before the first Tuesday in November 1767.

77. To the person who shall raise the greatest quantity of madder upon an acre, the quantity to be determined by the weight of the roots when taken up and cleaned; the candidates to give a particular account of their manner of culture; twenty pounds.

The certificates of the weight of the roots, when cleaned, to be sent in on or before the first Wednesday in November 1768.



**WILD MADDER.** 78. To the person who shall plant and cultivate the greatest number of plants (not less than five hundred) of the wild ever-green madder \*, of which a great quantity grows in Devonshire; twenty pounds.

Certificates of the number of the plants, with twenty of the plants, to be sent to the Society on or before the second Wednesday in November 1766.

**PRESERVING THE LIVES OF BEES.** Whereas the usual method of saving the honey from stocks or hives, is by destroying the bees; and whereas it is found by experience, that the honey and wax may be obtained, and the bees preserved at the same time; by which much larger quantities of both wax and honey are collected:

79. The Society will give a sum not exceeding two hundred pounds, for collecting wax, and preserving the lives of the bees, in the following proportion: To every person who shall collect from stocks of bees, his own property, within the year 1767, ten pounds of clean merchantable wax, without destroying the bees, leaving a sufficient quantity of honey for their winter sustenance; five pounds.

But in case there shall be above forty claimants, then the sum of two hundred pounds shall be distributed among the candidates, in proportion to the number of claimants.

Certificates of the quantity of wax and of the bees in each stock being alive on the first of February 1768, to be delivered on or before the first of March following.

N. B. A compleat apparatus for the purposes above-mentioned, may be seen at the Society's Office in the Strand.

**MACHINE FOR DRAINING LANDS.** 80. For a plough or machine, of the simplest construction, which shall, with the least force, cut a new drain one foot in depth perpendicular, one foot eight inches

\* The accounts of the experiments and observations, made by Mr. Dambourney on the *wild madder*, which induced the Society to offer this premium, may be found in *the Essays on Agriculture and Arts*, Art. V. page 29. E. O.

wide at the top, and ten inches at bottom ; both sides of the drain equally sloping, and the earth to be equally thrown out on both sides ; fifty guineas.

Certificates of the machine having performed the work agreeable to the terms of the advertisement, must be delivered in, together with a model, on or before the first Wednesday in December 1766.

**MACHINE FOR SLICING TURNEPS.** 81. For the best cheap \* machine for slicing turneps, in order to feed cattle, that will dispatch large quantities with more ease and expedition than by any method now practised ; twenty pounds. To be produced to the Society on or before the first Tuesday in November 1766.

**TURNEP-CABBAGE.** 82. For raising and duly cultivating the † turnep-cabbage, for the feeding cattle and sheep, on the greatest number of acres, (not less than three) and giving an account of the soil, culture, time of taking up, produce, and the effects on cattle and sheep fed with them ; twenty pounds.

83. For the next greatest number of acres, (not less than two) fifteen pounds.

The certificates, agreeable to the above conditions, to be produced on or before the third Saturday in March 1767.

84, 85. The same premiums are continued for the year 1767 ; and the certificates are to be produced on or before the first Wednesday in November 1768.

**BOORCOLE.** 86. For sowing, in the spring of the year 1767, and duly cultivating boorcole ‡, for the feeding of cat-

\* Observations on the utility of this machine, and the reasons for instituting the premium, may be found in Vol. V. No. 78. page 387. and in the notes on Mechanicus's letter, page 115, of the February number. E. O.

† An account of the culture, use, and advantages of the turnep cabbage, may be found in Mr. Wynne Baker's report, No. 52. Vol. V. page 257 ; and in Agricola's letter on that subject, Vol. VI. No. 7. page 46, of the January *Museum*. E. O.

‡ An account of the culture and uses of boorcole, in feeding cattle, &c. may be seen in Mr. Wynne Baker's report, inserted Vol. V. No. 52. page 257, of our work. E. O.



tle and sheep, on the greatest number of acres (not less than three) and giving an account of the soil, culture, produce, and effects on cattle and sheep fed with it; twenty pounds.

87. For the next greatest number of acres, (not less than two) fifteen pounds.

The certificates to be produced on or before the first Tuesday in May 1768.

*Premiums for Discoveries and Improvements in Chemistry,  
Dying and Mineralogy.*

SAL AMMONIAC. 88. For making the greatest quantity of sal Ammoniac, equal in goodness to the best imported, (not less than two tons) prepared at one manufactory in England or Wales, fifty pounds weight of which to be produced as a sample, on or before the third Tuesday in March 1767; one hundred pounds.

SUBSTITUTE FOR BORAX. 89. For five pounds weight of any substance made of British materials, that will answer the uses of borax in soldering, and is cheaper than borax, to be produced on or before the first Tuesday in January 1767; fifty pounds.

DYING SILK IN GRAIN. 90. For the most beautiful and durable scarlet dyed in silk with cochineal, not less than one pound to be produced as a specimen, on or before the second Tuesday in December 1766; forty pounds.

DYING YARN YELLOW. 91. For the greatest improvement in dying cotton or linen yarn yellow, a specimen, not less than one pound, must be produced on or before the first Tuesday in December 1766; forty pounds.

DYING YARN GREEN. 92. For the greatest improvement in dying cotton or linen yarn green, not less than one pound, to be produced on or before the first Tuesday in December 1766; twenty pounds.

*Premiums for promoting Polite Arts.*

DRAWING AT THE ACADEMY IN ST. MARTIN'S LANE. 93. For the best drawings of a human figure  
after

after the life, done at the Academy in St. Martin's-Lane, by youths under the age of twenty-four, to be produced on or before the first Tuesday in February 1767, and determined in proportion to their merits; twenty guineas.

These drawings are to be made during the meetings of the academy next winter, according to the rules laid down by the Society, which will be hung up at the academy.

To be made with chalks only.

**DRAWINGS FROM THE DUKE OF RICHMOND'S GALLERY.** 94. For the best drawings of any statue, at the candidate's option, in the Duke of Richmond's gallery, by youths under the age of twenty-one, to be produced on or before the first Tuesday in December 1766; an honorary pallet of silver gilt.

95. For the next in merit, an honorary pallet of silver.

These drawings must be left with the person who takes care of the statues, until they are delivered to the Society, and must be made with chalks only.

**DRAWINGS OF A HUMAN FIGURE.** 96. For the best drawing of a naked human figure, not less than sixteen inches high, after a picture, print, or drawing, by youths under the age of sixteen, to be produced on or before the last Tuesday in November 1766; an honorary pallet of silver gilt.

97. For the next in merit, an honorary pallet of silver.

The drawing to be made with chalk, or black lead; and of a different size from the original, which must be produced at the same time.

**DRAWINGS OF BEASTS, BIRDS, &c.** 98. For the best drawings or compositions of beasts, birds, dead game or still-life, after nature, by persons of either sex, under the age of twenty-one, to be produced on or before the second Tuesday in January 1767; an honorary pallet of silver gilt.

99. For the next in merit, an honorary pallet of silver.

**DRAWINGS OF FRUIT, FLOWERS, &c.**

100. For the best drawings or compositions of fruit, flowers, or plants, with or without reptiles or insects, after nature, by persons of either sex under the age of twenty-one; to be produced on or before the second Tuesday



Tuesday in January 1767; an honorary pallet of silver gilt.

101. For the next in merit, an honorary pallet of silver.

To be made with crayons, water colours, red or black pencils.

PATTERNS FOR WEAVERS. 102. For the best original pattern for weavers, by persons of either sex, of any age under thirty; to be produced on or before the second Tuesday in January 1767; fifty guineas.

DRAWINGS OF LANDSCAPES. 103. For the best drawings of landscapes after nature, begun and finished on the spot, by persons under the age of twenty-five; to be produced on or before the second Tuesday in November 1766, and determined in proportion to their merits; twenty guineas.

Each candidate must mention, on the front of his drawing, from whence he took his view; and the drawings must be made with chalk, pen, Indian ink, or bister.

#### HONORARY PREMIUMS FOR DRAWINGS.

104, 105, 106. In order to promote a love of the polite arts, and excite emulation among the nobility, a gold medal will be given for the best original design of any kind, made with chalks, black lead, pen, Indian ink, or bister; a silver medal for the second in merit; and a silver medal for the third in merit; by young gentlemen under the age of twenty, sons of peers, or peeresses in their own right, of Great Britain or Ireland; to be produced on or before the first Tuesday in March 1767.

107, 108, 109. The same premiums will be given on the like conditions to young ladies, daughters of peers, or peeresses in their own right, of Great Britain or Ireland.

110, 111, 112. A gold medal will be given for the best original design of any kind, made with chalks, black lead, pen, Indian ink, or bister; a silver medal for the second in merit; and a silver medal for the third in merit; by young gentlemen under the age of sixteen, sons of peers,

or peereſſes in their own right, of Great Britain or Ireland; to be produced on or before the firſt Tueſday in March 1767.

113, 114, 115. The ſame premiums will be given on the like conditions to young ladies, daughters of peers, or peereſſes in their own right, of Great Britain or Ireland.

**BASSO RELIEVO IN CLAY.** 116. For the beſt baſſo relievo in clay; the ſubject to be the death of Lucretia; by youths under the age of twenty-five, being their own compoſition; the height of the principal figure not leſs than fifteen inches; to be produced on or before the firſt Tueſday in February 1767; twenty guineas.

**MODELS IN CLAY.** 117. For the beſt models in clay, of an intire figure or figures, or baſſo relievo's, by youths under the age of twenty, being their own compoſition; to be produced as above; an honorary pallet of ſilver gilt.

118. For the next in merit, an honorary pallet of ſilver.

The models and baſſo relievos to remain two months with the Society after the determination.

**MODELS OF ORNAMENTS IN WAX.** 119. For the beſt models in wax of figures of beaſts or birds, fruit, flowers, or foliage, by perſons of either ſex under the age of twenty-one, taken from nature, and not from prints, drawings, models, or any fine works; to be produced as above; an honorary pallet of ſilver gilt.

120. For the next in merit, an honorary pallet of ſilver.

**ETCHINGS BY YOUTHS.** 121. For the beſt etchings copied from any prints, not leſs than nine inches by fix, each compoſition to be larger than the original, repreſenting landſcapes with figures, by young men under the age of twenty-five.

To be produced with the plates on or before the ſecond Tueſday in November 1766, and determined in proportion to their merits; twenty guineas; and three impreſſions to be taken from each of them for the uſe of the Society.

DITTO



**DITTO BY YOUNG WOMEN.** 122. For the best etchings copied from any prints, not less than nine inches by six, each composition to be larger than the original, representing landscapes with figures, by young women under the age of twenty-five.

To be produced with the plates on or before the second Tuesday in November 1766, and determined in proportion to their merits; twenty guineas; and three impressions to be taken from each of them for the use of the Society.

**METZOTINTOS BY YOUNG MEN.** 123. For the best scraping in metzotinto of a portrait from any picture of which there is no print, by persons under the age of twenty-five; twenty-five guineas.

The pictures to be produced with the plates on or before the second Tuesday in November 1766, and determined in proportion to their merits; and three impressions to be taken from each of them for the use of the Society.

**DITTO BY YOUNG WOMEN.** 124. For the best scraping in metzotinto of a portrait from any picture of which there is no print, by young women under the age of twenty-five; twenty-five guineas.

The pictures to be produced with the plates on or before the second Tuesday in November 1766, and determined in proportion to their merits; and three impressions to be taken from each of them for the use of the Society.

**ENGRAVING LANDSCAPES.** 125. For the best engraving of a landscape with figures, after a picture or drawing made by the candidate, from a picture of which there is no print, not less than sixteen inches by twelve, by persons under the age of twenty-four; twenty guineas.

To be produced with the plates on or before the second Tuesday in November 1766, and of a different size from the original; and three impressions to be taken from each of them for the use of the Society.

**INTAGLIOS.** 126. For the best intaglio engraved on an oval red cornelian, representing the Bacchus of

Michael Angelo in the Duke of Richmond's gallery, by persons under the age of twenty-eight; to be delivered, sealed up, on or before the second Tuesday in November 1766; twenty guineas.

The intaglios to be left with the Society one month, and three impressions in sulphur to be taken from them for the use of the Society.

**BRONZES.** 127. For the best figure in bronze cast and repaired, not less than eight inches high; to be brought in repaired on or before the first Tuesday in February 1767; twenty guineas.

It is not expected that the casting and repairing be the work of a single person.

The casts to be shewn to the Society before they are begun to be repaired.

The bronze, which gains the premium, to be left with the Society one month.

**LANDSCAPE PAINTINGS.** 128. For the best original landscape, on a canvas six feet four inches long, and four feet six inches high; fifty guineas.

For the next in merit, twenty-five guineas.

Proof must be made to the satisfaction of the Society, that the whole of each picture was painted in England, and since the first of January 1766.

The pictures to be delivered, without frames, to the register of the Society, on or before the second Tuesday in March 1767; and those which gain premiums, must remain with the Society two months after the decision.

**STATUES IN MARBLE.** 129. For the best original statue of a naked figure, as large as the life, wrought in white marble; to be produced on or before the last Tuesday in March 1767; one hundred and forty guineas.

130. For the next in merit, eighty guineas.

**BASSO RELIEVO'S IN MARBLE.** 131. For the best basso relievo, wrought in white marble, being an original composition of five or more human figures; the height of the principal figure not less than twelve inches; to be produced on or before the last Tuesday in March 1767; fifty guineas.

132. For



132. For the next in merit, twenty-five guineas.

Proof must be made to the satisfaction of the Society, that the whole of each statue and basso rilievo was executed in England, since the first of January 1765; and those statues and basso relievos which gain the premiums shall remain with the Society two months after the decision.

No person who has gained the first premium in any class will be admitted a candidate in a class of an inferior age; and no candidate shall receive more than one premium in one year; nor will they who for two successive years shall gain the first premium in any one class, be ever again admitted as candidates in that class.

Persons to whom premiums shall be adjudged, will be expected to give satisfactory proofs, that the performances by them produced are intirely their own without assistance.

No candidate shall send in more than one performance in any one class.

*Premiums for encouraging and improving Manufactures.*

**FINE LINEN YARN.** For fine linen yarn fit for lace or number thread.

133. To any woman or girl who shall produce to the Society the best fine linen yarn, not less than three pounds weight, fit for lace or number thread, and spun by themselves; twelve guineas.

134. For the next in merit, six guineas.

The thread to be spun after the first of April 1766, and produced to the Society on or before the first Tuesday in January 1767.

An ounce of each of the parcels which gain premiums to remain the property of the Society.

**FINE BROAD CLOTH FIT FOR THE SOUTHERN MARKETS.** Whereas notwithstanding the manifest superiority of the best English broad cloths, there is a kind of fine cloths in much demand at several foreign markets, and particularly those of the southern countries of Europe, especially of the following colours, *viz.* scarlet, black, blue, green, and white; the chief recommendatory

datory qualities of which cloths are fineness, lightness, a sponginess of texture that serves effectually to imbibe the dyes; so small a degree of pressure as will not injure the colours, or occasion spots from rain; the Society, from a desire of contributing all means in their power for extending our most valuable commerce in exported manufactures, do offer the following premiums, on the conditions annexed.

135. To the person or persons, who shall, on or before the first day of December 1766, have made and sold the greatest number of pieces, not less than ten, of such cloths as are above described, each piece to be full seven quarters wide, and of the usual length of broad cloth; forty pounds.

136. To the person or persons, who shall have made and sold the next greatest number of such pieces, not less than six in like manner; twenty pounds.

Satisfactory certificates of the making and selling of the said cloths, with the names of the purchasers, the dates of sales, and the prizes sold at; also, a piece of cloth (for the Society's inspection only) from each candidate, dyed either scarlet or black, and properly pressed, must be sent in on or before the second Tuesday in December 1766.

**KNITTING MITTS.** 137. For the greatest quantity of mitts made of thread, in imitation of lace, and made with knitting needles, fit for womens wear; not less than one dozen pair; each pair to be not less than fourteen inches in length, made by one person; the goodness, clearness, and fineness of the work, and beauty of the pattern, to determine the preference; twenty guineas.

The whole sum to be divided in proportion to the merit; to be produced on or before the first Tuesday in January 1767.

*N. B.* The persons who gain any of the above premiums to leave one yard of the lace, and one pair of mitts, as the property of the Society.

**WATCH FUSEE CHAINS.** 138. To the person who shall, before the last Tuesday in December 1766, have instructed in the best manner in any one manufac-



tory the greatest number of women and girls, not less than six, in making watch fusee chains; thirty pounds.

*N. B.* Certificates are to be produced, that the several persons so taught do actually gain their livelihood by making such fusee chains at the time of the claim.

139. To the person who shall, before the last Tuesday in December 1767, have instructed in the best manner in any one manufactory the greatest number of women and girls, not less than four, in making watch fusee chains; forty pounds.

*N. B.* Certificates are to be produced, that the several persons so taught do actually gain their livelihood by making such fusee chains at the time of the claim.

And samples of each of their performances are at the same time to be exhibited for the approbation of the Society.

*Premiums for Invention and Improvement in Mechanics.*

**MACHINE FOR EXTRACTING WATER OUT OF SHIPS.** 140. To the person who shall make, and prove by actual experiment on board of some ship in the river Thames, to the satisfaction of the Society, on or before the first Tuesday in May 1767, the best pump, engine, or other machine for extracting water out of ships, to be essentially superior to the chain pump, or any other engine now known or in use, as well for the expedition of work as for the saving of the labour of men; and in which simplicity and easiness of repair will be considered as a material part of its merit; one hundred pounds.

**IMPROVEMENT IN WHEEL CARRIAGES.** 141. To the person who shall make the greatest improvement in wheel carriages, with respect to the easiness of the draught, the facility of turning, and preservation of the roads; one hundred pounds; or a less sum in proportion to the merit of such improvement.

*N. B.* It is expected that the whole machine, whether waggon, coach, &c. complete for use, be produced by each

each candidate; and that notice be sent to the register of the Society on or before the first Tuesday in March 1767, that the said machines are in London ready for examination and trial.

*Premiums offered for the Advantage of the British American Dominions.*

IRON FROM BLACK SAND IN AMERICA.

142. To the person who shall make and import, or cause to be imported into the port of London, on or before the twenty-fifth of December 1766, the greatest quantity of merchantable bar-iron, made of the black sand found in America; (not less than fifty tons) one hundred pounds.

143. For the second greatest quantity, (not less than thirty tons) sixty pounds.

144. For the third greatest quantity, (not less than twenty tons) forty pounds.

PEARL-ASH. 145. For every ton of merchantable pearl-ash, made in any of his majesty's dominions in America, imported into the port of London within the year 1766; four pounds; except the several claims shall amount to a greater sum than four hundred pounds, in which case the said four hundred pounds shall be divided amongst the claimants, in proportion to the respective quantities imported by each.

COCHINEAL. 146. For the greatest quantity of merchantable cochineal, (not less than fifteen pounds weight) that shall be produced in, and imported from his majesty's dominions in North America, the West-India islands, and the Bahama islands, into the port of London, between the twenty-fifth of April 1766, and the twenty-fifth of April 1767; forty pounds.

147. For the second greatest quantity, (not less than ten pounds) twenty pounds.

148. For the third greatest quantity, (not less than five pounds) ten pounds.

SCAMMONY. 149. For the greatest quantity of good merchantable scammony, (not less than ten pounds weight)



weight) that shall be produced in, and imported from any of the British colonies in America into the port of London, between the first of January 1766, and the first of January 1767; fifty pounds.

150. For the next greatest quantity, (not less than five pounds weight) twenty-five pounds.

The several requisites contained in the foregoing articles, are to be ascertained by the following proofs, and in the following manner, *viz.*

First, by a certificate under the hand and seal of any known magistrate, or other public officer of the county, parish, precinct, township, or other division of the island or colony, within which parish, county, or other division, the article for which this premium is claimed has been produced, that the said article, expressing the quantity and the plantation whereon produced, is, of his own knowledge, or has been proved before him to have been the actual produce of such island, or colony, or county, parish, or other division thereof, between the times specified in each advertisement.

Secondly, by a certificate under the hand and seal of the proper officer of the port in the plantations in which such article shall be shipped for exportation, that the said article, expressing the quantity, has been actually entered with him for exportation to Great Britain as the produce of the said plantations.

Thirdly, a certificate under the hand and seal, of the proper officer of the port of London, that such article, expressing the quantity, has been actually imported from the plantations, expressing the island or colony from whence imported.

N. B. The goodness of the article for which the premium is claimed, must be proved by a certificate under the hand and seal of some well known merchant or broker, dealing in the article for which the premium is claimed, or by such experiment or examination as the Society shall judge necessary.

The requisites in the premiums for iron from black sand of America, pearl ash and cochineal, are to be ascertained by the following proofs, *viz.*

The first three articles the same as before; but instead of the *N. B.* the following article is inserted, *viz.*

Fourthly, a certificate under the hand and seal of some well known merchant or broker, dealing in the article for which the premium is claimed, of the goodness of such article; or proof may be made of its goodness by such other experiment and examination as the Society shall judge necessary.

**VINES FOR RAISINS.** 151. A premium of three hundred pounds will be given to that person who shall, on the first of September 1767, have or be possessed of a vineyard or plantation in any of the colonies upon the continent of North America, Southward of the river Delawar, consisting of the greatest number of vines, (not less than fifty) actually producing the true Malaga grape, from which the best raisins are made.

152. And one hundred pounds for a like plantation or vineyard, consisting of not less than twenty-five plants, producing the said grapes.

153, 154. The same premiums for vines for raisins will be continued to the year 1770, with the following additional *N. B.*

*N. B.* It will be expected that the claimants for the above premiums should, at the time of making the claim, produce a quantity (not less than six pounds) of raisins, certified to have been actually produced from vines for which the premium is claimed.

**VINES FOR WINES.** 155. A premium of two hundred pounds will be given for the greatest number (not less than five hundred) of the plants of the vines, which produce those sorts of wines now consumed in Great Britain, which shall have been properly planted, and effectually fenced, secured and cultivated within any of the British colonies upon the continent of North America, to the Northward of the river Delawar, considered as one district,



district, between the first of April 1762, and the first of April 1767.

156. And fifty pounds for the next greatest quantity, not less than one hundred plants.

157, 158. The like premiums will be given, upon the same conditions, for the greatest number of vines in like manner planted and cultivated as above, within the same time, in any of the British colonies on the continent of North America, to the Southward of the river Delawar, considered as one district.

159, 160. And the same premiums, for the greatest quantity in like manner planted and cultivated within the same time, in the Bermuda islands.

161, 162. The like premiums will be given, upon the same conditions, for the greatest number of vines which produce those sorts of wines now consumed in Great Britain, which shall have been properly planted, and effectually fenced, secured and cultivated within any of the British colonies upon the continent of North America, to the Southward of the river Delawar, or in the Bermuda islands, each to be considered as one district, between the first of April 1767, and the first of April 1768.

163. A premium of two hundred pounds will be given for the greatest number (not less than five hundred) of the plants of the vines actually producing the grapes that yield those sorts of wines now consumed in Great Britain, which shall have been properly planted, and effectually fenced, secured and cultivated within any of the British colonies upon the continent of North America, to the Northward of the river Delawar, considered as one district, between the first of April 1768, and the first of March 1770.

164. And fifty pounds for the next greatest quantity, not less than one hundred plants.

165, 166. The like premiums will be given, upon the same conditions, for the greatest number of vines in like manner planted and cultivated as above, within the same time, in any of the British colonies on the continent of North America, to the Southward of the river Delawar, considered as one district.

167, 168. And the same premiums, for the greatest quantity in like manner planted and cultivated, within the same time, in the Bermuda islands.

**CINNAMON.** 169. A premium of one hundred pounds will be given for the greatest number (not less than fifty) of the plants of the true cinnamon tree which now grows in the island of Guadaloupe, properly raised or planted, and effectually fenced, secured and cultivated in any of the British islands in that part of America commonly called the West Indies, between the first of January 1763, and the first of January 1767.

170. And fifty pounds for the next greatest quantity, not less than twenty five-plants.

171, 172. The like premiums will be given, upon the same conditions, for the greatest number of cinnamon trees, properly planted, secured and cultivated as above, in the Bahama islands, within the same time.

**ALOES.** 173. The like premium of one hundred pounds will be given, upon the same conditions, for the greatest quantity (not less than fifty) of the aloes plants, of the same species as that from which the true socotorine aloe is produced, properly planted, and effectually fenced, secured and cultivated within any of the British islands in that part of America called the West Indies, between the first of January 1763, and the first of January 1767.

174. And fifty pounds for the next greatest quantity, not less than fifty plants.

175, 176. The like premiums will be given, upon the same conditions, for the greatest number of aloes, properly planted, and effectually fenced, secured and cultivated, within the same time, in the Bahama and Bermuda islands.

*N. B.* The plant of the true socotorine aloe may be procured from most of the Botanic gardens about London.

**BARILLA.** 177. The like premium of one hundred pounds will be given, upon the same conditions, to any person who shall plant and properly cultivate the greatest quantity of land (not less than fifty acres) with Spanish kali or glass-wort, of the same species as that from which  
barilla



barilla is produced, within any of the British colonies upon the continent of America to the Southward of the river Delawar, between the first of April 1766, and the first of April 1767.

178. And fifty pounds for the next greatest number of acres, not less than twenty-five.

The claims upon the foregoing articles of culture to be respectfully ascertained by a certificate under the hand and seal of some known magistrate, or chief officer of the county, parish, district, precinct, township, or other division of the colony or island within which parish, county, or other division of such colony or island, the article for which the premium is claimed has been planted, that the said article, expressing the number of plants, (or acres, as the case shall be) and the name of the planter, has, of his own knowledge, or has been proved before him to have been planted, and effectually secured and cultivated within the said colony or island, between the times specified in the advertisement, and was under actual and proper culture at the time of signing such certificate.

**SILK COCOONS.** 179. For every pound weight of cocoons produced in the provinces of Georgia and South Carolina in the year 1766, of a hard, weighty, and good substance, wherein one worm only has spun; three pence.

180. For every pound weight of cocoons produced in the same year, of a weaker, lighter, spotted or bruised quality, though one worm only has spun in them; two pence.

181. For every pound weight of cocoons produced in the same year, wherein two worms have spun; one penny.

*N. B.* These premiums will be paid under the direction of Mr. Ottolenghé, superintendant of the silk culture in Georgia, to every person who shall bring his or her balls or cocoons to the public filature at Savannah; upon proof being made to the said Mr. Ottolenghé's satisfaction, by every person claiming such premium, that the cocoons for which the premium is claimed are of such claimant's own raising and produce; and the sum which shall be so paid  
by

by the Society's correspondent as aforesaid, shall be reimbursed and repaid to him or his order by the Society, upon receiving his account of the same properly attested.

**SILK, RAW.** 182. For every pound weight of merchantable raw silk raised and produced in the colonies of Connecticut, Pennsylvania, and North Carolina, in the year 1766, two shillings and six-pence; the said premiums to be paid by the Society's correspondents in the respective colonies, *viz.*

|                 |   |                            |
|-----------------|---|----------------------------|
| Connecticut, by | { | Col. Phineas Lyman,        |
|                 |   | The Rev. Mr. Thomas Clap,  |
|                 |   | and                        |
|                 | { | Jared Ingersall, Esq.      |
| Pennsylvania,   | { | Benj. Franklin, LL. D. and |
|                 |   | John Hughes, Esq.          |
|                 |   | { George Pollock,          |
| North Carolina, | { | Cullen Pollock, and        |
|                 | { | John Rutherford,           |
|                 |   | } Esqrs.                   |

Upon proof being made, to their satisfaction, by every person claiming such premium, that the silk for which it is claimed has been actually and *bona fide* reeled from cocoons of such claimant's own raising and produce; and the sums which shall be so paid by the Society's correspondents as aforesaid, shall be reimbursed and paid to them respectively, or their order, by the Society, upon receiving their accounts properly attested.

**NITRE IN AMERICA.** 183. For every thousand pound weight of merchantable salt-petre, equal in goodness to the best imported from the East Indies, made in any of his majesty's dominions in America, and imported into the port of London in the year 1766, five pounds; except the several claims shall amount to a greater sum than three hundred pounds; in which case the said sum of three hundred pounds shall be divided among the claimants, in proportion to the respective quantities imported by each.

**COBALT IN AMERICA.** 184. To the person who shall discover cobalt in his majesty's dominions in America,  
and



and shall produce one hundred weight of the same to this Society, on or before the first of January 1767; fifty pounds.

*N. B.* Satisfactory certificates of the place where it was discovered, and of the probability that a quantity may be had sufficient for a manufactory of zaffre and smalt, will be expected by the Society.

*N. B.* The claims arising from all the foregoing articles relative to the colonies must be made, and the certificates brought into the Society within four months after the dates mentioned in the respective advertisements.

**PROVINCIAL GARDENS.** 185. As the setting apart proper spots of land in our colonies in North America, as gardens or nurseries for the making experiments in raising such rare and useful plants as are not the spontaneous growth of this kingdom or of the said colonies, as well as for receiving such as are the produce of America, but at present not commonly known; and the appointing proper persons to superintend such gardens or nurseries, may be of great public utility in introducing a variety of articles of commerce, necessary for manufactures, medicine, or other-ways, (which we are now obliged to take from foreign nations) thereby laying a foundation for a more extensive culture of them: the Society, desirous of promoting this object as far as lies within their province, and the nature of their design, do hereby declare, that in case the legislatures of any of the said colonies, or any other incorporate bodies, shall think fit to encourage such undertakings by public grant, or private contributions, the Society will, from time to time, as experiments made in such gardens shall succeed in the production of any article of public use, give proper premiums for the more extensive production of such, to the benefit of the trade and commerce of this kingdom.

*N. B.* No premium will in any case be given, unless the performance be deemed by the Society to have sufficient merit to deserve encouragement; and the Society reserve to themselves the power of giving in all cases such part  
only

only of any premium as the performance shall be judged to deserve.

It is required, in all cases where it can be done, that the matters for which premiums are offered, be delivered in without names, or any intimation to whom they belong, that each particular thing be marked in what manner each claimant thinks fit, he or she sending with it a paper sealed up, having on the outside a corresponding mark, and on the inside the claimant's name and address.

No papers shall be opened but such as gain premiums, all the rest shall be returned unopened, with the matters to which they belong, if enquired after by their marks within two years; after which time, if not demanded, they shall be publicly burnt unopened, at some meeting of the Society.

Whereas there are societies for the encouragement of arts, manufactures, and commerce, in that part of Great Britain called Scotland, and also in Ireland; therefore all the premiums of this Society are designed for that part of Great Britain called England, the dominion of Wales, and town of Berwick upon Tweed, unless expressly mentioned to the contrary; and the claims shall be determined as soon as possible after the delivery of the specimens. Proper affidavits of such certificates as the Society shall require, are to be produced on every article.

All matters, for which the Society proposes premiums, must be begun after the publication of such premiums, unless there be a particular exception in the said publication.

No person will be admitted a candidate for any premium offered by the Society, who has obtained a patent for the exclusive right of making or performing any thing for which such premium is offered.

A candidate for a premium, or person applying for a bounty, being detected in any disingenuous methods to impose on the Society, shall forfeit any such premium or bounty, and be deemed incapable of obtaining any for the future.



*Note,* Any information or advice, that may forward the designs of this Society for the public good, will be received thankfully, and duly considered, if communicated by a letter directed to Dr. Templeman, the secretary, at the Society's office, opposite Beaufort Buildings, in the Strand, LONDON.

*Claims to be made, and Certificates to be brought in, on or before,*

Anno 1766.

Novem. 1st. Tuesday. { **A** CORNS. Chesnuts. Elm.  
Carrots. Parsnips. Machine  
for slicing turneps. Madder.

2d. Tuesday. { Drawings of landscapes. Etch-  
ings. Metzotintos. Engra-  
ving landscapes. Intaglios.

Last Tuesday. Drawings of human figure.

2d. Wednesday. Wild Madder.

December 1st. Certified samples of grass seeds.

1st. Tuesday. { Dying yarn green and yellow.  
Drawings at the duke of Rich-  
mond's gallery. Culture of  
wheat, rye, &c. Accounts of.

2d. Tuesday. { Dying silk in grain. Ditto cot-  
ton or linen yarn. Fine broad  
cloth fit for the Southern mar-  
kets.

25th. Iron from black sand of America.

1st. Wednesday. Machine for draining lands.

|                    |                                                                                                          |
|--------------------|----------------------------------------------------------------------------------------------------------|
| 31st.              | { Pearl-ash from America. Silk<br>Cocoons. Raw silk. Salt-petre<br>from America.                         |
| Anno 1767.         |                                                                                                          |
| January 1st.       | Scammony. Cobalt in America.                                                                             |
| 1st. Tuesday.      | { Substitute for borax. Knitting<br>mitts. Fine linen yarn.                                              |
| 2d. Tuesday.       | { Drawings of beasts, birds, &c.<br>Drawings of fruit, flowers, &c.<br>Drawings of patterns for weavers. |
| Last Tuesday.      | Fir. Lord Weymouth's pine.                                                                               |
| Feb. 1st. Tuesday. | { Drawings at the academy. Bassa<br>relievos in clay. Models in<br>clay and wax. Bronzes.                |
| Last Wednesday.    | Parsley.                                                                                                 |
| Mar. 1st. Tuesday. | { Honorary premiums for drawings.<br>Improvement in wheel-carriages.                                     |
| 2d. Tuesday.       | Landscape paintings.                                                                                     |
| 3d. Tuesday.       | Sal ammoniac.                                                                                            |
| Last Tuesday.      | { Statues and bassa relievos in marble.                                                                  |
| 3d. Saturday.      | Turnep cabbage.                                                                                          |
| April 1st.         | Barilla.                                                                                                 |
| 25th.              | Cochineal.                                                                                               |

May



May 1st. Tuesday. { Machine for extracting water out  
of ships.

Nov. 1st. Tuesday. { Acorns. Chesnuts. Elm. Car-  
rots. Parsnips. Madder.

December 1st. Grass seeds gathered by hand.

Last Tuesday. Watch fusee chains.

### N U M B E R LIII.

*Observations on the Structure and Manner of Use of the Spiky  
Roller, by Mr. Randall,*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

**I**N your *Museum* for last December, I observe my name mentioned concerning the spiky roller. Without making any comment on the Clay Farmer's dimensions, for constructing this implement of husbandry, I beg leave to tell him \*, and the rest of your readers, that the length of

\* We are greatly obliged to Mr. Randall, for communicating to us what, on his great experience of this most useful implement of husbandry, he finds to be the best proportion, and construction of it. We think it an addition to the obligation the public lies under to him, of being, in fact, the *inventor of it*. For the introduction into use of such an instrument, though a loose hint of it might be found in some corner of an author, certainly carries with it the merit of an invention.

This account of the dimensions of the spiky roller, will serve as a general standard for the proportions of the instrument: but, doubtless, the absolute magnitude of the roller, and length, or perhaps form, of the spikes, &c. may be varied with advantage, according to the texture and consistence of the soil, on which the roller is employed. Very stiff land, which is a real strong clay, will certainly coalesce into larger and more tenacious and hard clods, than ground, which is less stiff, and, though still

C c c 2

clayey.

of mine, which was the first I ever saw or heard of, except what the late Mr. Ellis mentioned to so little purpose, was seven feet, the diameters of the ends eighteen inches, and the whole cylinder made of the heart of oak : and when the irons were burnt in, and the man seated on the box designed for that purpose, the weight of the whole was about a ton. But you will think it strange, that the blunt end of the irons were opposed to the clods, and run more taper, till they came to the surface of the cylinder, into which the irons were burnt, and inserted about three inches : which was their length above the surface of the roller, and which, I always found, very sufficient to crush the hardest clod that ever came in their way. Had I, indeed, attempted to go on the ground, when the soil was not perfectly dry, this position of the irons would have carried the clods round with the roller : for it is not its province to squeeze but crush. Nor indeed can a man do more harm to his ground, than going upon it, when it is

clayey, approaches more to the nature of loam ; and consequently it will require a greater weight to crush, and longer spikes to penetrate and divide the clods. The roller, therefore, should certainly be adapted to the quality of the soil, as to stiffness or looseness : for wherever weight, and the length of spikes, can be spared, not only the original expence will be diminished more than in a direct proportion ; but less force will be required for the working the roller : which is a still more material consideration. It is to be hoped, that an implement, so obviously beneficial in all stiff clayey countries, will soon be generally adopted, at least by gentlemen, who pursue improvements in husbandry : and that a more extensive practice with it, will show what are the extreme proportions, from the greatest magnitude required in the most tenacious ground, to the least that will be sufficient for the lightest, where such an instrument can be at all useful. The communications of what may thus appear, will be a great advantage to the public ; as it will tend to the quicker introduction of the use of this roller among farmers, and those whose circumstances do not admit of disbursements for precarious and speculative purposes : but who would, nevertheless, be very ready to save the expence of clotting, and prevent the hazard of sometimes losing the season for sowing, by the purchasing of an instrument, of which the efficacy, as to those points, was certain. E. O.

not



not quite dry, with a roller, constructed according to the Clay Farmer's form and size of the irons; or by that which I have recommended. I am sensible, those, who construct the roller, according to the Clay Farmer's directions, imagine, that by inverting the shape, there is less danger of carrying the moist clods round with the roller: but, I must say again, there is no occasion for this precaution: for, if the other form be at all necessary, it must be in the moist state of the ground: which is the only reason, we should keep the roller off the soil. I had the irons fixed in four inches asunder, in the first row, from end to end. The second row began just between the first and second irons of the first row. The third row was like the first; and the fourth like the second. Then alternately for the whole surface of the cylinder, as near as could be, the irons were four inches asunder in each individual row, and four inches from row to row, as nearly as the superficies of the cylinder would permit. I do not know how to convey a juster idea to your readers of the shape of the irons, than to call them Ox-harrow-teeth. For when I sent for the workman, I desired him to make so many of this denomination; six inches in length; and burn the small end three inches into the wood: he went from me, as perfectly understanding what I meant; brought his number of irons; and inserted them a proper depth into the cylinder. If some of your South-Country readers should be at a loss to know what is meant by ox-harrow-teeth, they will be pleased to remember, that they are irons fastened into two harrows, which are drawn by either four oxen and two horses, or six oxen alone, in very stiff soils. Now, it will appear to you, that the roller itself, and one harrow, will require at least four able horses, according to the Clay Farmer's stating the case: but my roller, without harrows, always stood in need of three stout horses, which the man, from his box, always drove a-breast, for the greater convenience of turning on the land's ends. But were I to have two ox-harrows, (which would only extend the length of the roller) follow-  
ing

ing the roller, for the purpose of tearing up clods, in order to be crushed, on going a second time over the same, seven feet in length, I should be obliged to have a much stronger team than four stout horses; and, therefore, I must beg leave to observe, for this, an unanswerable reason, that harrows are better omitted; as they always were, by my people, who set in with their ploughs, and turned up the soil from all requisite depths, in order to have it crushed by the roller going twice in a place.

If the Clay Farmer will not take it amiss, I would tell him, that wheels to the roller only create expence and trouble. For I do not remember we ever had any disadvantage from the weight of them in my four rollers, made for near a thousand acres of land, of all denominations of soils, stiff and light: for, when the fellows had occasion to convey the roller from one inclosure to another, and sometimes over the hard high road, I never heard, or observed, there was the least difficulty of doing it: as the irons were so stout, as not to receive any injury in the passage, otherwise than by friction; by which they would be indeed in time somewhat impaired. As to the width of the gates, I think there was never any stoppage; since the men, when they found the passage rather too strait, could, by turning the horses heads, easily incline the roller on one side, and by that means wriggle it in, where it was too long for entrance. Let who will be the *father*, or *grandfather* of this valuable instrument of husbandry, I had reason to be extremely well pleased with my lucky hit, in constructing it from Mr. Ellis's barely mentioning a spiky roller: though, from his usual giddiness, he gave his readers no more than the name. As it is of consequence to the world, to keep the expence\* of this instrument

\* The cheapness of every implement of husbandry, of a more complex nature, is a capital part of its merit, as it conduces, according to Mr. Randall's very just observation, to render its use general. It is with satisfaction, therefore, we find the spiky roller, according to his construction, can be managed without wheels,



ment as low as possible, I shall be very sorry to hear any more of wheels; for it may deter farmers from using it; and without their hearty concurrence, all will be only playing at farming. Gentlemen may please themselves in every variation of the implements, and modes of culture: but without the assistance of those, who bless the nation with their endless toil, a thousand years hence will be as to-morrow. I heartily wish you may succeed in endeavouring to prevail on all your correspondents, to sign their real names to their essays: as that will greatly promote agriculture; and remove the appearance of vanity: and that you will likewise recommend it to them to avoid all altercations \*: as this may discourage some of the best friends

wheels. This convenience in it, must be imputed to the spikes being made with very blunt ends; which prevents their penetrating into, and tearing up the road, or any other even ground over which the roller passes: as their great strength, likewise, saves them, from being turned or broken. The Clay Farmer, therefore, might, according to the tapering and pointed form of the spikes of his roller, find occasion for wheels: and indeed it seems, as if great inconveniencies would result, from the want of them, where the spikes are sharp, and consequently disposed to penetrate into, and fix themselves, in the ground, where the surface is level and firm. Not only the reason of the thing itself; but the clearness, and ingenuity, with which the writer of the Clay Farmer's letter delivered his brief account, dispose us to think, he did not mistake in this point, and add the wheels without having experienced some just ground for it. But both these opinions, though at first seemingly contradictory, are, in reality, very reconcileable, from the difference of the two rollers in this particular. For where the spikes are very thick set, and the ends extremely blunt, or rather broad, the roller may pass on, as an even cylinder would, without piercing the level firm ground. Whereas, on the other hand, where the spikes are so sharp, that the weight of the roller must of course make them penetrate, it must certainly require to be borne up from the ground; and moved forwards, by means of some proper carriage, and wheels, when it is not intended to act: otherwise it would both tear up the ground injuriously; and suffer great damage itself. R.

\* If Mr. Randall be a constant reader of our *Museum*, he may have observed, that there is very little reason for any complaints,

friends to agriculture, from engaging in your useful undertaking. I do not mean, by this, that nobody must make any replies, to what you insert: but that it may be done, as people engaged in the same noble cause, without any touch of pride or ostentation. For some of your readers are like the sensitive plant; which recoils on the approach of too rough an application.

I am, GENTLEMEN,

York,

Your most obedient servant,

May 24, 1766.

J. RANDALL.

### N U M B E R L I V .

*Observations on the Importance of planting quick-growing Trees ;  
and on the Nature and Use of several particular Kinds.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

**T**HE subject of wood and timber hath been but little noticed during the publication of these papers: though it appears a matter of some importance to every head of a family in particular, when considered as wanted

on this account, in the last five or six numbers. We have, since that time, taken the liberty of suppressing whatever had a tendency to any thing of this kind: and if some particular gentlemen should think it extraordinary, that we have omitted, or softened expressions they might suppose allowable, they would certainly excuse us, if they knew, in what manner, we had done the same to others, who had made attacks on them. It is certainly not the office of this work, to expose persons; or cherish disputes among particulars: but to bring to light, and diffuse the knowledge of unknown truths, and material facts: and though, in the progress of this, *opinions* may with propriety be canvassed, contradicted, and even confuted; yet *men* should not be reflected on, nor suffer any personal censure. Neither Mr. Randall, therefore, nor any other gentleman, need, for the future, fear any disagreeable comments of this kind: but may deliver their notions with a full security, that if they were really as he says delicate as *the sensitive plant*, they will not be shocked by the approach of too rough an application. E. O.

for



for fuel, building, or fences; and of much greater to the public, when its general utility to a maritime state comes under our notice.—Considerations of this kind, I make no doubt, were the principal motives, which induced the Society of Arts, Manufactures, and Commerce, to propose honorary premiums for the propagation thereof: and which, with an emulation in some noble-spirited persons to do something for the benefit of futurity, have given being to a great many plantations, designed solely for timber. If to this, be added the present taste for pleasure ground, in which many trees of the forest kind are dispersedly planted, it is very probable our successors may reap considerable profit from the spirit and amusement of their predecessors.

But notwithstanding this, it is a very great chance, whether great part of these promising plantations may not fall short of the probable advantage, which might accrue from them, for want of due attention in the proprietors to the consequences of the single article of *lopping*. The improper practice of this hath spoiled, not to say destroyed, more timber than the navy of Great Britain hath consumed.

For what is more evident than this, when, in most inclosed countries, we see the trees of every species of timber beheaded, at about ten or twelve feet from the ground, if seeming likely to spread their heads; or else sharpened up, if inclined to be more aspiring, as soon as they become of size sufficient to bear the weight of a man.

The *first* of these operations is certain destruction to all knee timber, and crooks for the ship carpenter: such trees being afterwards commonly lopped, as often as the boughs become of size large enough for faggot-wood. And the *second* is destruction to boards, planks, and quarter: because, at every limb, which has been cut off, there will be a defect, when the tree overgrows the wound: as there never will be any union between the dead knot, and the living knot, which overgrows it.

Besides these evident failures, in quantity and goodness, the trees, thus dismembered, never grow so fast, as those

which happen to escape : but are generally small, knotty, and defective.

I am aware of an objection, that will naturally arise. Some may say, What must be done for fuel, where coals, or peat, are remote, if none of the trees in the hedge-rows or woods must be lopped? To such, I would give this answer, That, in every county, some sorts of wood, of quick growth, which will do very well for fuel, may be raised. Such as the white poplar, or abele, alder, many kinds of willow, and the asp or trembling poplar, in moist lands : the ash, hazle, birch, maple, sycamore, and elm, in dry, gravelly, stony, or loamy lands ; and the broad-leaved brown willow, on mountains. This last defies the blasts of western winds. Plantations of it should be encouraged purposely for fuel : and while they are growing to maturity, sufficient to answer the demand, the trees already polled, will furnish a supply. The young trees, of spontaneous growth, together with such others, as are the production of modern plantations, whose youth hath rendered them unfit to bear the weight of the labourer, should be left to mature their promising timber, undisturbed in a healthful and flourishing state.

I would not be understood hereby, not to admit any under boughs of trees to be taken off. For it is consistent with reason, that young trees ought not to be overburthened with heads : but in cutting such boughs, I find, by observation, it is best to cut them about twelve inches from the trunk ; by which means they generally remain many years alive, though not productive of much shoot : and, in this state, the body of the tree unites with them, as it swells by vegetation, so that no dead wound will be in the timber afterwards.

Since my reducing the foregoing hints to writing, an ingenious correspondent, who signs himself *Philosylva*, hath favoured your collection, with two pieces on these subjects ; both of which are well worthy the notice of the public. In one of them, No. 43. Vol. VI. is recommended the planting of *Lombardy* and *Carolina* poplars :



and in a former the willow, called by that correspondent, the *Norfolk willow*: but, in these western parts, the Dutch willow: respecting each of which, I beg leave to make some remarks, founded on my own observation.

The Lombardy poplar I take to be the white poplar\*, or abele of Parkinson, page 1410. Because, from what

\* The white poplar is a tree of great value; and has all the good qualities ascribed to it by Ruricola; both with regard to its quick growth, and the soundness and beauty of its wood. It is not, however, the same kind of tree, with the *Lombardy* or *Italian poplar*: nor is, we have great reason to believe, nearly equal to it in the rapidity, as it may be called, of growth. Philosophylva, in speaking of it in the letter, referred to by Agricola, had a retrospection to another letter on this particular subject, published in a former number, giving a description of the tree, and an account of its late introduction into France. Both Philosophylva, and the ingenious author of that other letter, are, as we have great reason to presume, much too well acquainted with matters of this kind, to fall into such mistakes, as the supposing the abele, or white poplar, to be a kind of tree not yet brought into our country; as is there said to be the case of this: and, moreover, the species here called the Lombardy kind, though not hitherto brought into our country, is, nevertheless, well known to many gentlemen intelligent in botany, who have seen it in Italy or France. The Marquis de Chambray, who has, as mentioned in that letter, taken great pains to introduce it lately into France, is well versed in the nature of trees; and could not possibly imagine the white poplar, a tree common in his country, and long known there under the names of *peuplier blanc* and *peuplier a larges feuilles*, to be a new kind: the advertisement of the public nursery at Sens, from the Royal Society of agriculture at Paris, quoted in Philosophylva's letter, sets forth likewise its being a new species: and Mr. Pelé de St. Maurice, a member of that body, says, "it is vastly superior, in point of benefit, to all the other kinds of poplars." From all these several authorities, there can remain no doubt but that the Lombardy poplar is, as yet, a stranger in this country; and that it greatly exceeds the white poplar in quickness of growth, and other material properties: otherwise the Parisian Society, the Marquis de Chambray, and other improvers of agriculture in France, to whom the white poplar is familiarly known, would scarcely be so ardent, in recommending and propagating this tree. It were to be wished, we had an opportunity of judging of this from our own observations, as such trees are no where more wanted than in our country, under the present circumstances. E. O.

I have observed, of its growth in this climate, I believe, what is said (in the said letter) of its surprising growth in the much warmer climate of Italy.—I have seen, in the northward parts of Herefordshire, many of these in the state of large timber trees, growing on a soil, where but few of the sorts of our common timber trees would thrive: being a thin loamy surface, on a wet gravelly bottom. I have seen floors, and wainscoting, made of boards of this wood; that looked very beautiful, both in colour and grain: and, on inquiry, found it was lasting.—In Wiltshire, about Laycock, these trees are planted, with the Norfolk, alias Dutch willow: and are both headed down, to about ten feet, purposely to produce wood: being both of very quick growth. But the poplar exceeds the willow, in number and length of boughs.—These trees are easily propagated by cuttings: which grow to admiration. I have seen growing, in a gentleman's plantation, at Frenchay, near Bristol, the Carolina poplar, which make annual shoots of such lengths, as it would be incredible to say. But, for two winters past, the tops of these shoots have died \* for several feet downwards: a circumstance, which renders this tree unfit for our climate. As thereby the limbs are retarded in progress; and become crooked. This tree is about four years old. The Lombardy, or white poplar, I take to be a very suitable tree for planting about Battersea and Clapham. The soil

\* The Carolina poplar is really possessed of that amazing celerity of growth, when planted in some soils, which Agricola here mentions: and, even in soils, which are not moist, it outstrips, perhaps, any other known tree. This would certainly render it very advantageous to our country, as Philoſylva has observed, if it were better known; and more generally cultivated. The supposition, which Ruricola has observed, of its being a tender tree, and liable to lose its tops, is merely the effect of some accident which happened to the trees he saw near Bristol. For there are great numbers of this kind of poplar, in various plantations and nurseries, which have never suffered in any season: and, indeed, after they are firmly rooted, perhaps few kinds of trees are harder. We much wish to know the comparative merits of this and the Lombardy kind. E. O.

there-



thereabouts, being such as would well agree with it. The Norfolk, alias Dutch willow, would grow surprisingly in the meadows by the Thames side, if planted on the banks of ditches : and both, by being lopped every five or six years, would produce a profitable crop to the proprietors : though either will make tall trees \*.

I am, GENTLEMEN, your's, &c.

May 23.

RURICOLA GLOCESTRIS.

## NUMBER LV.

*An Inquiry relative to the Culture, &c. of Hemp : In a Letter from Mechanicus.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

**P**ERHAPS the frequency of my writing upon subjects hitherto of little importance to the *public*, may be thought, by many of your correspondents, too trifling, to merit a place in the *Museum Rusticum*. Whenever, *gentlemen*, you view any of my letters in that light, I beg you will suppress, or at least postpone their publication : in order to make room for more useful matter. Whatever, *gentlemen*, you may adjudge to be their fate, I shall acquiesce with it : for certainly you must be the best judges

\* We apprehend our good correspondent Ruricola is somewhat deceived in this particular : for both the *abele* and Norfolk willow, will grow to be large trees ; and even vie with most of the forest kinds. The Norfolk willow is, perhaps, the largest of the willow tribe : but the *bright swallow-tailed willow* has sometimes attained such size, that Mr. North mentions, in his account of the Norfolk willow, inserted in *Philosylva's* letter above quoted by *Agricola*, he knew of two willow trees, which he believed to be the swallow-tailed willow, that sold for fifteen pounds. Certainly these trees must have been of a very considerable size ; or they could not have produced so great a price as seven pounds ten shillings each. E. O.

of what suits your design.—The very great regard I have always entertained for the *Museum Rusticum*, like the fond enamoured votary for his mistress, gives me a kind of an *eager desire* of paying my devotions, by scribbling as often as I have leisure, which mostly happens on the *Sabbath-day*, for want of other opportunities. When *bigotry, ignorance, and superstition*, usurped the place of reason, it might have been termed an *heretical profanation of the Sabbath*; I hope, *gentlemen*, in these more enlightened days, it will be allowed, that by such a practice, I do not much transgress either the divine or human laws: if, by so doing, I can promote the welfare of mankind, and make the least addition to useful knowledge, that has either an immediate or more remote tendency to it, I am in some degree (I hope) discharging my duty. For most, I believe, will allow, that the chief and ultimate end of *true religion is the promoting human happiness*; if so, every man, who promotes human felicity, has certainly a just claim to favour and protection, both from the divine and human institutions, especially, in a country, where liberty and reason are inseparable companions, and claim a legal settlement. I cannot prevent myself on this occasion from reciting, an energetic, and to me, harmonious couplet, of that celebrated poet, Mr. Pope.

For modes of faith, let graceless zealots fight;  
His can't be wrong, whose life is in the right.

An abrupt transition from ethics, which, I confess to be an intrusion, and foreign to your plan, may seem an odd contrast: especially, when the article *hemp* appears to be the subject of my inquiry. I am very sure that this useful *domestick vegetable*, deserves to have more notice and regard paid to it, than hitherto it has met with in this part of Staffordshire, where it is confined to the corners of gardens, or small \* hempbutts.—I have looked over the table

\* The cultivation of hemp in Great Britain is certainly a specious object; when we consider the great consequence it is of  
as



ble of contents of all the five volumes of the *Museum Rusticum*; and cannot find, that it hath, in that useful work, yet been the subject of consideration.—I only found that a correspondent, who signs himself a Subscriber, see Vol. II. No. 13, proposes it as a subject of inquiry, and you, gentlemen, in a note to the same letter, desire some of your corre-

as well with respect to our maritime concerns, as many other uses: and that, moreover, we pay very great sums for it to Russia, and other north-eastern countries. But when, on the other hand, we take in various particulars relative to our present circumstances, we may doubt whether the culture be not an improper subject of pursuit; unless in a limited manner, and peculiar situations. It is certain, that hemp was once more cultivated in Great Britain than at present: and it will throw some very material lights on the matter, to examine why the culture of it is now diminished. The result of such an inquiry will be this simple answer, that the cultivation of corn, became more profitable than that of hemp: and was, therefore, substituted in its place. If it be further asked, why this is so? The answer may be, that hemp very soon impoverishes the ground, on which it is raised: and requires, therefore, either to have fresh land broken up for it; or a considerable proportion of manure to keep up that, on which it has been before raised. Since, therefore, manure became dear, by the extension of the tillage of corn, or other articles which increased the consumption of it, the produce of hemp would not afford to pay for it: and the cultivation was accordingly of course discontinued, except in some peculiarly favourable soils, or in such quantities, as would require only the manure which could be spared from corn, &c. in particular places.

The above principle prevails so far, that the Society for promoting Arts, &c. who appropriated seven hundred pounds, for several successive years, for premiums for hemp in England, could not, in the least, promote the growth of it: but had, perhaps, fewer claimants at last, than when they first made the offer.

The culture of hemp must, therefore, be confined to places where the soil is particularly adapted to it, with the aid of only a small proportion of manure; or to a small quantity, where some manure can be with convenience spared from the other demands of a farm. In the latter case, an acre, or two, will sometimes be of great service: where there are spare hands, that can dress and manufacture it in the winter: and by such means make a return of profit into the family, for the time, such hand would otherwise gain nothing.

384 MUSEUM RUSTICUM, &c.

correspondents, to communicate a full and satisfactory answer, to this sensible *gentleman's* important question.—As I have not yet seen any answer thereto, relative to the *culture of hemp*, I humbly join with you, and that *gentleman*, in this \* request, that some one of your many *contributors*, who are acquainted with its cultivation, will condescend to oblige me, and the public, with a compleat set of directions, in every necessary article respecting its cultivation; the properties, and management of the soil; the quantity of seed proper to sow a statute acre; and some plain directions, if they can be verbally given, how to distinguish good seed. For, I suppose, a judicious choice of seed to be a very necessary article towards insuring success.

I am, GENTLEMEN,

Your obedient humble servant,

MECHANICUS.

In this limited light, must the culture of hemp be regarded in England. But to our American colonies, who have fresh ground without bounds, must we look for the saving, that is to be made in the balance of trade, with regard to this article. E. O.

\* The compliance with Mechanicus's request, of communicating the best method of cultivating and dressing hemp, may, however, not only be of some benefit here, but conduce to the improvement of that article, in America; where such knowledge is much wanted. E. O.



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# Museum Rusticum, &c.

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For J U N E, 1766.

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VOLUME the SIXTH.

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NUMBER LVI.

*Observations on the Cultivation and Use of Lucern in Picardy.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

**A**S I gave you some account of the propagation of lucern, so far as a trifling experiment made thereon, under my own eye in England, would admit, it may not be unacceptable to many of your readers, (notwithstanding so much has been said about it already) to give them some account of this useful plant; and the manner of propagating it in France.

I have, between the fifteenth and twenty-fifth of May, travelled through the towns of St. Omer, Capel, Lisle, Douay, Cambray, and many small villages; and having my own horses, and finding, at all these towns, lucern in abundance, I have fed them with nothing else. At the village from whence this letter is dated, I lay at the house of a sensible farmer, from whom I collected the following

VOL. VI. No. 33.

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particulars. He says, at this time, the first crop is in perfection: which is about two feet high, and very full of leaf; but without blossom. About a month hence a second crop will be fit to cut, equal in goodness to the first: and in November a third, but much shorter, and inferior to the two former. That it makes excellent hay; and is a most advantageous and useful plant. They generally choose low marshy ground, to sow it in; and, when it first appears above ground, they set the peasants to dance upon it, (that was his expression): but I suppose, rolling it to secure the root in the ground, is all that is necessary. They never turn the cattle into the field, to eat it from the earth: but fetch it home tied up in small bundles. Indeed it is evident enough, that cattle turned in to graze upon a plant two feet high, must, by that means, destroy much more than they eat. What difference the climate or soil of this country may create, so as to render the propagation of lucern in England less beneficial than in France, I am not a competent judge of. But certainly, if neither of these are an impediment, it must be highly worthy the attention and cultivation of the English farmer.

In this country, where there is *no land without aid*, there is not to be seen the smallest spot uncultivated! In our fertile isle, how many thousand acres lye waste! If, as I pass further through this kingdom, any thing occurs, that I think may prove useful to your work, you shall hear \* from me.

Gournay, in the  
Province of Picardy,  
May 25, 1766.

I am, GENTLEMEN,  
Yours, &c.  
P. T.

*P. S.* The farmer tells me, that most of the hay consumed in Paris is lucern hay: and that abundance of lucern grows near that city.

\* We are greatly obliged to *P. T.* for this offer: and with much, that his example of making his travels subservient to the public advantage, by observations on the agriculture and arts of the countries, he passes through, were imparted to the world in the same manner. E. O.



## NUMBER LVII.

*Account of the best Manner of cultivating and preparing Indigo in Carolina: And of the Manner of cultivating of Indigo, Cotton, and Tobacco on the same Land in China.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

AS I do not find any answer given to *Americus's* enquiries, concerning the culture of the anil, or Indigo plant; and cotton shrub; as likewise the process of making the Indigo from the plant; I have here ventured to send you such observations, as my situation would permit me to make: with an account of the process, and culture, as practised in Carolina, by a person, who (if I am rightly informed) excelled that whole province in making of the Indigo: having, some years before, lived among the French, as well as Spaniards: of whom he learned this method of making all the various sorts mentioned.

The land, on which the Americans cultivate their Indigo, is what they here call *Up-land*; that is, land which lies above the level of the sea, or any of the contiguous creeks or rivers, in Carolina. This sort of land is much like that in China, in the same situation, in point of quality: being, for the most part, a thirsty gravel, with here and there a thin covering of hazel mould: which last is the land, the Americans always make choice of. They generally first break it up with the plough: and afterwards work it fine, with the hand-hoe. By the latter end of March they have it formed into little ridges, about eighteen inches asunder, running north and south as nearly as the ground will admit of. They then sow the seed at two feet distance, by means of a dibble\*, with which they  
make

\* Mr. Miller, in his Dictionary, rightly observes, that the sowing the Indigo might be very advantageously cultivated by

make the holes about three inches deep: and into each of them, they put about a dozen seeds, that are lightly covered by hand. After this, if the planter be so fortunate, as to be favoured with a little rain, the plants, in a few days, begin to make their appearance: after which, the ground requires hoeing and weeding: as, if it be a little while neglected, it will be soon over-run with weeds, that will in a great measure destroy the plants. But with care and management, as directed, the Indigo will be fit to cut about the middle of June: (which is, their first crop.) This is performed with a sharp instrument, with which they cut it as low as there are any leaves: observing to leave standing, such plants, as appear most luxuriant, in order to raise seed for another year. After this, they give the ground a good hoeing: and the plants shoot out new branches, that send forth fresh leaves; which they commonly let stand, as long as the season will admit: of which they judge, by the falling of the lowest leaves, that happens about the beginning of August.

I shall now proceed to the process: which I shall give you *verbatim* as it came to me.

Cut the herb in the morning; and put it into the vats as soon as possible, in order to prevent its wetting or heating: which are both prejudicial. Then pump at least

the use of the drill-plough. There was one great impediment, till lately, to the use of the drill-plough, which was the difficulty of procuring such an implement on a good construction. For tho' many different kinds had been tried, yet they were all attended with considerable inconveniencies: and those, which executed tolerably, were very liable to be out of order. But this obstacle is now removed. For the Society for promoting arts, &c. have this year adjudged premiums to two different persons, for the improvement of drill-ploughs: and both the kinds are simple, cheap, easily made, repaired, and appeared, on actual trial, by the committee, to answer the purpose perfectly well. Models of the real ploughs may, therefore, be easily had, by means of those repositied in the Society's collection of machines: and there can be no doubt, but that the use of them would answer perfectly well in the cultivation of Indigo, and occasion a very great saving in the production of that valuable commodity. E. O.



three or four inches water, above the herb. Because the wash of this water cleanses, and brings off with it the fine particles of Indigo : which might otherwise remain among the leaves. Bore a hole, with a small gimblet, through the side of the steeper, about two inches from the bottom : which, stop lightly with a small plug ; so that there may be a continual dropping from it, down the side of the steeper. This trickling down the steeper, is the infallible rule, to know when the liquor is impregnated, and fit for the battery. After the herb has been in two hours, attention should be given to this dropping ; and a clean chip laid underneath for it to run over. This chip will be stained green ; and the green colour will increase as the liquor strengthens, till at last, you will see the edges of this little stream grow coppery : on which, you must immediately draw off : or your quality will be destroyed. This will be sooner or later, according to the heat of the weather, or the quality of the water. It generally happens, from three and a half \*, to four, five, or six hours, from the herb's being put in : but as the weather grows colder, this appearance will be later. The liquor should run off of a bright green, intermixed with a yellow ; of a golden colour, and bright. The water, on the top of the steep, should have the same appearance, as when first put on the herb ; and not be tinged with green : as that is a certain sign of fermentation † ; which when it happens, destroys

\* Father Le Bat, who published in his voyages, an account of making Indigo in the French American islands, where he was some time resident, says, The time of steeping should be from six to twenty hours, according to the time the fermentation comes on, making that, instead of the appearances of the colour, as here directed, the criterion of the proper period. The reason of this difference, which is a very extraordinary one, we shall see in the note below. E. O.

† There is a very remarkable difference, betwixt this account, and Father Le Bat's, of the proper time of steeping the indigo : and the reason for it. Here four hours to six is said to be sufficient, and that above all things *fermentation* is to be avoided, as " it destroys the quality, and renders it absolutely impossible

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destroys the quality in the steeper; and renders it absolutely impossible, by any art, to bring it to life in the battery. The stems of the herb should stain green, and not

“ to bring it afterwards to life in the battery.” Father Le Bat, on the other hand, declares five or six times that space to be necessary: and that an actual and strong *fermentation* should be allowed, “ till,” as he says, “ the effect of the fermentation appear; the fluid heat, and boil up on all sides; and, the water, which at first was clear, insensibly grow thick, and become of a blue, inclining to a violet colour.” The fermentation is assigned by him, as the cause of the production of the blue colour: and so it has been understood, by all other writers, and most other persons, till now: as appears, indeed, from our correspondent’s own account of his neighbour’s notions, below given, as expressed in their proverbial maxim, of *steep soundly, and beat roundly*. Without allowing this to be the principle; we must admit the colouring matter, or substance of the Indigo pigment, to exist natively in the plant: and then it is very difficult to account for the comiscibility with and solution in water: to which, without the medium of some putrefied matter, or the caustic alkali, experiments shew it to be extremely repugnant. It can only be explained thus, that the Indigo herb has a very great propensity to ferment: and that it does so in a certain degree, even in the short period of four or five hours, though not in such as to show itself by ebullition and heat: that the colouring matter does exist in a native state in the plant, in a condition which renders it soluble in water, with the aid of a slight putrefaction in the concomitant substance of the plant: and that this insensible putrefaction, is sufficient to burst the vessels of the plant, let loose the colouring matter, and supply the necessary medium for combining it with the water: which, without the aid of some degree of putrefaction, cannot be effected. Premising these principles, certainly our correspondent’s method will produce a much finer kind of Indigo, than the other: though the product must be much less. For where a great part of the viscid matter of the herb is commixt with the colouring matter, it must greatly deprave it: and Father Le Bat must have given an account of the manner of making coarse Indigo only, such as was mostly produced at that time in the French islands: though the Spaniards did then, on the American continent, make some, that was very fine. It were much to be wished, that our planters strove to improve the quality rather than to increase the quantity, as they would not only find it soon answer, on account of the immediate greater price they would obtain for it; but as it would quickly tend to the exclusion of the French, or other Indigo, from our markets. E.O.

red,



red, as is commonly waited for. This is all that is needful to be done in the steeper: only observe, to keep the vessel sweet, and clean, by rinsing it well after every steeping. In order to this, when the week's work is done, throw out the herb immediately; and do not let it lie in the steeper till Monday; as is usually the case, to prevent its leaking: but pump some clean water in its stead: or, depend on it, your next steeping will be lost. For though it may produce very fine mud, and answer all the foregoing symptoms; yet, when dry, the produce will be little better than dirt.

Before we go to the battery, it will be necessary to inform the reader concerning the lime-water used in it. It is made, by steeping a quantity of unslaked lime, in common soft water, discretionally: which, after some time soaking, is left to settle; and then drawn off clear from the lime. This lime-water should be prepared before the steeping comes on; and that, in a considerable quantity, as you will see hereafter.

THE BATTERY, though less dangerous, is more curious. As it is impossible to bring the quality to life here, when killed in the steep; so it is almost impossible to kill it here, when put in alive. I have tried every experiment, I could think of, and still a fine colour remained: sometimes a fine copper; at others, a beautiful purple: and, when properly managed, the fine *flora*.

THE FINE COPPER is the product of beating without lime-water, till the fine green is changed to the purple, or violet; which generally happens in about two hours: and then, a little lime-water to settle it; though it will do without it.

THE FINE PURPLE is made, by beating from five to ten minutes; and then putting in lime-water sparingly, till the green, as above, changes to the purple, or violet colour.

THE FINE FLORA, which is the most advantageous, is made in a different manner from either of the other sorts: that is, as follows. Charge the battery with one-sixth  
of

of as much lime-water, as you have liquor in the steep; and watch carefully the infallible symptoms from the steep: on the appearance of which, draw off to the lime-water in the battery; which will increase the beauty of the colour. When you begin to work in the battery with your buckets, the drops which fall from them, look like beautiful green blowing flies. As soon as you begin beating, start your lime plug again a little; and let it constantly run during the time of beating, in the manner the steep does at its last running: which may be out of a hole made with a spike gimblet. Continue beating till it is of a fine violet colour, on the top, without having any regard to the grains: for while they appear, you are not perfect. Grains will appear before you begin to beat, being collected by the lime-water: which is a good rule to govern the maker, in what proportion to put it in. The dissolved matter being thus collected, are proof against all the assaults of the air; and the liquor, by beating, will come to its proper colour: which, to a curious maker, will be in about half an hour. When fully beaten, on the top of the water, is a fine violet cast, and no appearance of grains, till it has been put by on some vessel or plate, in a still place, for four or five minutes. The thin flakes of water, that fall from the buckets, seem purple; and are occasioned, only by the revolution of the fine blue appearing. It is a yellowish water, that is to come off when drawn: but the main body will still be green. Draw off in the morning, or sooner, if you have occasion. The water, on the top of the battery, will then be a little green; but the bottom of a straw colour. I now beat two hours: but have beat three quarters of an hour for trial; which produced a coarse grain, but a fine blue, full of green specks, which disappeared in drying, and was saleable.

In short, you cannot hurt it, in the battery; otherwise, than by letting in unsettled lime-water. I know it will be objected, by some, who will say, that by putting in lime-water too soon, they have spoiled their Indigo: which I deny.



deny. For their Indigo must have been spoiled in the steeper; and it proved so: as it could not stand the test. For which reason, most makers will not put it to the trial: but follow the old saying: *Steep soundly, and beat roundly*: and, after they have jumbled up \* a parcel of corrupt filth, put in a little lime-water to subside it: and produce what, when dry, can scarce be called Copper Indigo.

THE MUD is dried in square boxes, three inches deep, covered in the bottom with woollen cloth: which is again covered with Osnaburg linens: and the boxes, being fixed, half way into the ground, in sandy or gravelly soil, you may put in the mud, out of the battery: and it will soon drain and be fit for the press.

Thus far from my American friend. I shall now, without apologizing, give you, with all possible brevity, my own observations, made on the Chinese culture of this plant; as I have seen practised on an island, contiguous to where the European ships lay at Canton: which is the only cultivated spot, we had the liberty of going on. Here we used to spend our leisure hours, when the weather was seasonable. As to the beauties of the spot, and the unparalleled industry of the Chinese peasants, I shall pass them over: being too prolix; and foreign to my present subject: though truly worthy the imitation of my fellow countrymen. The first time I was on this delightful spot, it was in some places just cleared, of what is known to the English by the name of *Calaventias*: which is a species of

\* This explains what our correspondent meant above, in the expression of bringing to life again in the battery. He clearly did not intend to have it understood, that Indigo cannot be produced at all, where a strong fermentation of the herb is suffered, but that the finer kinds, the *purple*, and the *flora*, cannot be obtained in such manner: though an inferior kind of the copper, as he allows here may. And this verifies our preceding observation, that the seeming contradiction, in facts, between Le Bat and him, is to be reconciled, by supposing that he has given an improved process for making fine Indigo; and Le Bat, an account of that formerly practised in the French islands, which produced only a coarse kind. E. O.

the *phascolus*, or kidney-bean. In other places, it was planted with the cotton shrub; which had succeeded the *Calaventias*. The ground being laid out in oblong squares, stretching north and south, nearly. Such as lay low, had deep drains cut round every square. The land, on the hill sides, was made level, so as to retain all the moisture that came on it; for which it seemed to have great occasion: being a thirsty gravel full of small stones. The low land was seemingly rich, though not deep in soil. This land was capable of being flooded at pleasure, by a tide creek: but it was always kept dry when in this culture. These little plantations were formed into ridges, the length of the square, at such distance, as to admit walking among the cotton, without doing it any injury, when in bloom. There stood a row of plants on each ridge, at about three feet distance from one another: and, between each of these plants, stood a small plant or tuft of Indigo: which, in some places, was but just appearing: in others about three inches high: and the cotton was from half a foot, to a foot and half high. This was on the eighth of June. The land had been made excessive fine: and was clear of all manner of weeds. For I observed, there were servants, whose sole business was, to look after it; and to destroy the vermin: particularly the cockroaches: for the catching of which, there were several traps, set on every patch. On the twenty-second of the same month, I found all the rest of the island planted with cotton, and Indigo, in the same form; which made a most beautiful appearance. For it stood in the nicest order, I ever beheld; and scarce a weed to be found among it. That, which was first planted, was now beginning to flower: being from two to three feet high. The Indigo was about five or six inches high, with extreme small stalks, like young clover; but vastly laden with leaves; which it could scarce support. The cotton flower is succeeded by a round pod, something less than a wallnut, that, in a little time, bursts, and discloses the cotton: which is plucked, just as it becomes ripe. The latter end of July, the land was intirely



intirely cleared of the cotton : and I found small sets of tobacco, in their places : which I supposed to have been transplanted thither. The earth, having been first hoed towards the Indigo ; which now appeared master of the field : but how long it remained, I cannot say. For it was the beginning of November before I could have an opportunity of paying my little paradise another visit : when I found all those transitory beauties were fled : and nought remained, but the roots of the tobacco ; which stood in hillocks : the earth, as I fancied, having been hoed towards them on the cutting of the Indigo. The process for making of which, I could not learn.

How far this sort of culture would answer \* in the western part of the world, I know not : but should think, if followed with the like assiduity, it could not fail of success. As to the plants, I find, they have got more † than one or two sorts in Carolina. For the Indigo, they cultivate, is a stronger sort of plant than the Chinese, I see : and there

\* The double cropping land, though hitherto practised, by the Europeans, in but few instances, might certainly, in many cases, be made to be of great benefit : not only on account of the double product obtained from the same expence of rent, tillage, &c. ; but because the two kinds of plants, may be so adapted to each other, as wholly to exclude weeds ; and at the same time shade the ground, so as to prevent that too great exhalation and dryness, which in loose soils is often a great disadvantage, where plants grow in rows or drills. E. O.

† There are three kinds of the Indigo plant, which have been cultivated in the British dominions, for the making the pigment of that name. The Jamaica wild Indigo ; the Guatimala Indigo ; and the Carolina wild Indigo. But the Guatimala kind, is that, which has been mostly used : though it has been said by some persons, who have made trials of it, that the first sort, which will grow much larger, and thrive on poorer land, is on those accounts more profitable ; and will produce as good Indigo. There are, in the botannic collections of plants in England, three or four sorts of the eastern species of Indigo : but it does not appear, that any of them have been carried to our American colonies, in order to their being tried as to their produce. It is very probable, however, that, among them, is the species, which our correspondent here mentions, to have been cultivated along with the cotton. E. O.

is, as I am told, an American sort, which will stand their winters. But, as the excellency of the plant consists in the multiplicity of the leaves, it is not in my power to determine, which may be the best. The cotton plant, I have been speaking of, is, I understand, somewhat different from that cultivated in the west. But there is one thing more to be added in favour of the Chinese culture, that by thus varying the kinds of plants, they can for ever keep their land in tillage. Whereas, in Carolina, this sort of land is soon worn out; and the cultivator obliged to remove: and, further, the cotton seems to be intended as a shade, to the Indigo, from the meridian sun: which would be too intense for that tender plant, in its infant state.

As your truly laudable work seems to be calculated for the emolument of mankind in general, not forgetting the poor and indigent, I flatter myself, the matter I am going to inform them of, may not be unacceptable to some of your readers.

But to be brief. Business a few weeks past lead me into the country, where I took up my lodging at a tolerable inn. When, at supper, I was particularly pleased with the bread; which was not quite so fair, as the London bread, nor so light; but light enough, in my opinion, and moisture: having, as I thought, a peculiar flavour. My landlord, on seeing me take such particular notice of it, asked me if I knew what it was made of? or if I could perceive any uncommon ingredient in it? On being answered in the negative, he told me, it was *potatoe bread*. The method of making which, is so simple; and so great a saving, that he says, he never intends to make any other: as it pleases his customers equally as well, as if it was all wheat. The method, he takes, is, to have the potatoes well boiled: and then peeled. After which, they are mashed with a trencher; as for a potatoe pudding: adding thereto, the usual quantity of barm, or yeast; which is stiffened with wheat flower; and, in all other respects, this is treated as common bread. The quantity of flour, in proportion to the usual quantity, in the same sized loaves, he



he could not exactly tell; but judged to be little more than one-third: it required a little longer baking than ordinary; but will keep much longer than wheaten bread. That which I saw, was between three and four days old. We had it toasted and buttered to breakfast: in which form, I thought it equally as good as before. The relief, which this bread might afford the poor, must be obvious to every one: and, as to the healthfulness of it, I think it needless to say any thing.

If this should be thought worthy a place in your publications, I shall venture to send you such sketches of American husbandry, as I shall judge worthy your notice. Though I am afraid, there are but few practices here, in that science, worthy the imitation of the English farmer.

I am, GENTLEMEN,

Your very humble servant,

WENSLEY-DALEAN.

## NUMBER LVIII.

*Account of the Construction and Use of two Horse-hoes, or Hoe-ploughs, laid before the Society for the Encouragement of Arts, &c. by the Inventor, W. Hewitt.*

*To the Society for the Encouragement of Arts, &c.*

GENTLEMEN,

PERUSING the Essays on Husbandry, I observed particularly, that the author, page 105, expresseth hopes of seeing some “new-invented plough, cheap, simple, and  
“rightly calculated for *destroying weeds; keeping plants*  
“*clean; and stirring the ground:*” and, page 106, further says, “now as most people prefer useful, and cheap, to  
“elegant and expensive inventions, it is natural to wish  
“for a hoe-plough intirely simple, and not costly. For  
“the meshanism of those devised hitherto, by ingenious  
“lovers

“ lovers of agriculture, is of so perplexed, and complicated a nature, that it will no ways answer the common purposes of husbandry : but, being perpetually out of order, will throw the poor ploughman into despondency ; and the rather, as neither he, nor the country plough-wright, can comprehend how to rectify any defects, or accidents, except with extreme difficulty.”

The very name of a *hoe-plough*, suggested the idea of an instrument, which I shall call a horse-hoe ; whose construction is intirely new, simple, and much less costly than a common plough. Such as country plough-wrights, and smiths, are able to make ; and such as common ploughmen are able to use : and which seems, according to the hopes of the aforesaid author, to be rightly calculated for destroying weeds ; keeping plants clean ; and stirring the ground.

This horse-hoe, — a model of which I beg leave, in the most respectful manner, to present to this honourable Society, — I hope may be of a very extensive use in agriculture, as it must be much more efficacious, and expeditious too, than any kind of hand-hoes for the destruction of weeds, and stirring the ground \*. For if the instrument does not cut below the crown, or head, of the roots, such roots will sprout again, and the first labour become fruitless ; which indeed is too often the case of hand-hoeing : as the labourer, sometimes, only scratches the surface of the earth, and shaves off the leaves of the weeds, the roots remaining intire and unhurt, to vegetate again. With this instrument, the husbandman may hoe the ground so deep, that it will infallibly cut asunder the roots of every weed, it meets with, below the crown or head ; and, consequently, either destroy them, or at least greatly check their future growth that season.

This instrument is calculated for hoeing the intervals between the generality of plants in straight rows : — such as transplanted lucerne, — beans, — peas, — and turneps, sown

\* Essays on Husbandry, page 84.



with a drill-plough, &c. In large gardens,—hop grounds,—nurseries,—and plantations of young trees, much labour and expence, in hand-hoeing, may probably be saved by the use of it.

In the county of Norfolk (and probably in many other places) the husbandmen, in the months of March and April, preparing their lands for barley, generally give them a certain number of earths, according to the phrase of that country; or, in other words, plough them a certain number of times. In those months the weather is frequently very dry; and the soil being turned over and over again, and exposed to the sun and wind, becomes so dusty, that a great part of the seed will not grow without rain; which, sometimes not falling in many weeks after the seed-time, causeth the crop to consist of different growths: so that when the first grown corn is ripe for the scythe, the latter is but just eared. This evil, perhaps, may, in some measure, be remedied by the use of this horse-hoe, instead of the common plough, at that season. For this will stir, and loosen, the earth as effectually, as the other; and at the same time, neither remove, nor turn it over, which seems to be beneficial, in a drought, upon very light and sandy soils.

With respect to foul summer fallows too, it may be of singular service. The common plough buries the weeds, of which many grow again. This horse-hoe will cut their roots asunder, below the surface of the earth; and by leaving their foliage above it, exposed to the summer sun, the greatest part of them will wither and die: so that they will not give the husbandman much more trouble, the remaining part of the summer. And, as this hoe may be eighteen or twenty inches broad, two acres of land may be hoed by it, as soon as one acre can be ploughed, by the common plough.

This new instrument is intended for a public benefit; and to the consideration of the public, as well as of this honourable Society in particular, it is freely submitted. If it be judged an useful implement in husbandry, well; if  
not,

not, the pleasure that has arisen from the hope of doing good, has amply rewarded, for his trouble, the inventor, who has the honour to subscribe himself,

GENTLEMEN,

Hadleigh,  
April 19, 1766.

Your most humble,  
and obedient servant,

WILLIAM HEWITT.

*P. S.* Since I had compleated this model \*, I apprehended, that its utility might be rendered still farther extensive,

\* The Society, on receiving the former part of this letter, referred it to their committee of agriculture, who thought so well of the model, as to resolve to have one of the ploughs executed in large by Mr. Pearce of Whitechapel; in order to have an actual trial of its operation, and efficacy; which is accordingly now finished.

On being informed of this further invention, the Society resolved to write to Mr. Hewitt, to send up, at their expence, one of the new kind in large, which is also arrived.

Both these will be tried, by the committee, the first opportunity: and the merits, and utility, of them, duly ascertained. This method of proceeding in the Society, by actual trials, at their own expence, of the machines, or implements proposed as improvements in husbandry, cannot fail to be of the utmost service to the public: as it not only decides the particular merits of such machines, and implements, and encourages the invention of them; but also tends to ascertain the principles on which the success of such inventions depend.

Along with the plough, Mr. Hewitt sent the following information to the Society, of the effects and price of it.

“ On Friday evening, I had the pleasure of seeing an acre of  
“ transplanted lucerne, belonging to Peter Newcome, Esq; tho-  
“ roughly hoed by this instrument in less time than three hours;  
“ when and where it answered my warmest expectations. This  
“ little lucerne inclosure is situated upon the side of a hill, and  
“ is almost square. The rows consequently being short, and  
“ requiring very frequent turnings, retarded the progress of the  
“ hoe. I mention these circumstances in particular, because, in  
“ a plain field, one furlong long, an acre may be hoed in much  
“ less time.—I have added a rake, which may oftentimes be  
“ useful in scattering the *amputated weeds*. It is no essential part  
“ of



tensive, by a very small alteration; therefore, gentlemen, I take the liberty of laying before you another model, calculated for hoeing the furrows between wheat ridges, which all farmers acknowledge to be very good husbandry, though very many of them are deterred from the practice of it, for want of a cheap expeditious method of putting it in execution. An instrument of this kind, I am persuaded, will very greatly expedite that useful work: and if it meets with your approbation, gentlemen, many lovers of improvement in agriculture may be induced to give it a fair and impartial trial.

“ of the hoe, indeed, and may be used, or not used, at the discretion of the husbandman. This appendix is omitted in the Smith’s bill, who was ordered to make the horse-hoe, at an expence not exceeding forty shillings.

## A Copy of the Smith’s Bill.

|                                                      | <i>l.</i> | <i>s.</i> | <i>d.</i> |
|------------------------------------------------------|-----------|-----------|-----------|
| “ A horse-hoe — — — — —                              | 0         | 10        | 6         |
| “ The side-irons and two bolts, weight 24lb. at fix- |           |           |           |
| “ pence a pound — — — — —                            | 0         | 12        | 0         |
| “ Eight small bolts and screws — — — — —             | 0         | 2         | 8         |
| “ Two fers * for the wheel — — — — —                 | 0         | 0         | 8         |
| “ Four hoops for the same — — — — —                  | 0         | 1         | 4         |
| “ Two pins, two chains, and two staples — — — — —    | 0         | 1         | 0         |
| “ The wheel and handles — — — — —                    | 0         | 11        | 0         |
|                                                      | <hr/>     |           |           |
|                                                      | 1         | 19        | 2         |
|                                                      | <hr/>     |           |           |

“ The same wheel, and side-irons, and even the handles, with a very little trouble, may be fixed to a variety of hoes of different sizes.”

\* Two small hoops within the nave of the wheel.

FIGURE I.

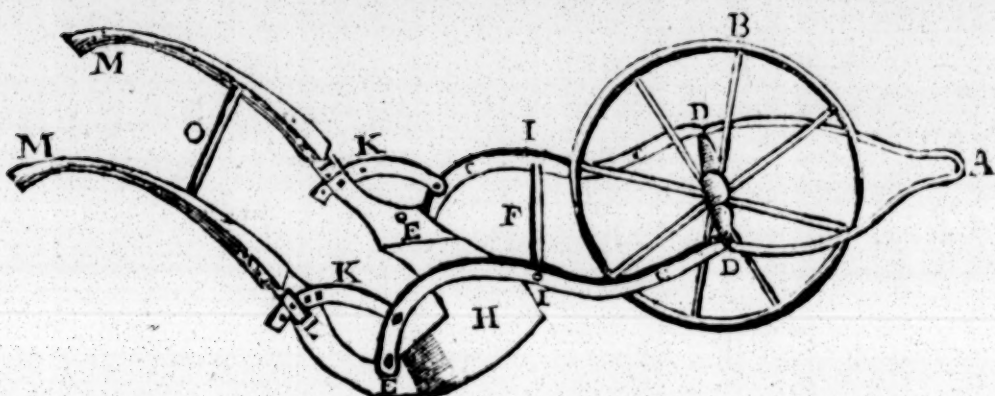
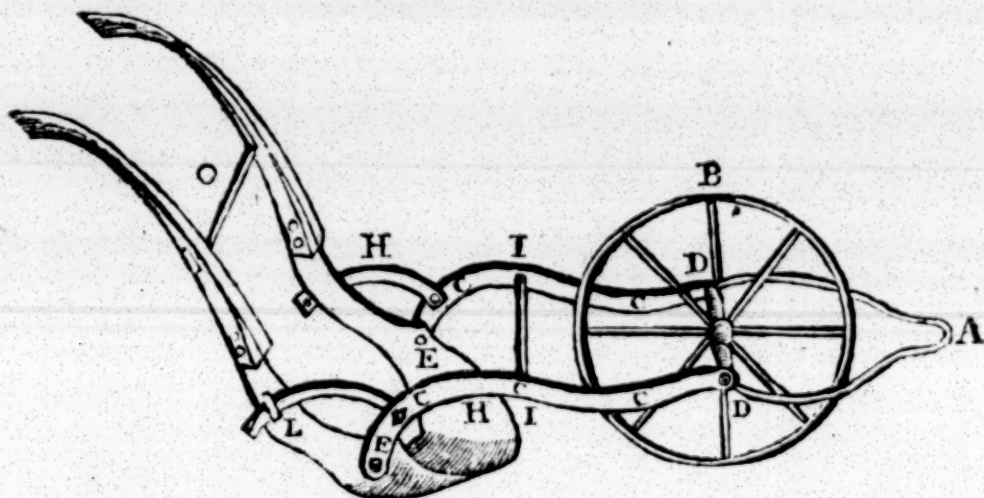


FIGURE II.

*An Explanation of the Horje-Hoe. Figure I.*

A. represents a small round curved iron bar, fixed upon each end of the axle of the wheel, by which the horse-hoe is drawn.

B. the wheel three feet in diameter.

C c. two flat iron bars, three feet long, fixed upon the axle of the wheel, at D d. and to the sides of the hoe; at E e. by bolts and skews: upon these bolts, as well as the axle of the wheel, they are moveable.

F. a small round iron bar, fastened at each end, into the two bars; C c. (to strengthen them), at G g. from and



to G. these bars may be straight. From G. to E. let them be curved.

H. the hoe itself; the breadth of which may vary according to the different distances of the rows of plants, whose intervals are to be hoed.

K K. two little flat curved iron bars, fixed by bolts, upon which they are moveable, to the bars C c.—Each of them pass through a staple, fixed into the sides of the hoe at L l. In both these, little bars, is a row of holes. In each of the staples, is one hole; and, directly opposite to them, one hole in each of the sides of the hoe: and, by means of two bolts, passing through these holes, and some of the holes in the bars K K. the hoe is fixed to any position; so that the ground may be hoed as near the surface, or as far below it, as is necessary.

M M. two wooden handles, fixed to the two sides of the hoe, and to each other, by the cross bar O; as long, and as high from the ground, as the handles of a common plough.

FIGURE II. represents the horse-hoe, intended for hoeing the furrows, between wheat ridges: which differs only, in one respect from the other. That hoe is flat; this is curved. The breadth, and curvature of this, must depend intirely upon the breadth, and curvature of the furrows, to be hoed. In which respect, every sensible farmer can easily direct the smith how to form it. But, after all, if any persons be inclined to make trial of this instrument, I would advise them not to trust to a verbal description, but to send for a model of it to Thomas Tillett, a very ingenious smith at Hadleigh in Suffolk.

## NUMBER LIX.

*Observations on the Structure, Use, and Expence, of public Granaries; in order to demonstrate the Impracticability of erecting them in Great Britain; and the consequential Expedience of continuing the Bounty on Corn.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

HAVING, in my last letter, offered some reasons for continuing the bounty upon corn exported, I thought it the less necessary to say any thing relating to public granaries, as the intention of them will be answered much better by the bounty, if that be shewn to be a right measure; and to state the argument concerning granaries with some degree of clearness, required much too long a discussion. But since you desire it, I shall now proceed to give the reasons of my opinion, why such granaries are not adviseable in England.

The design of public granaries is to make corn cheap; and to keep it, as near as can be, to an equal price, that the inhabitants, particularly the poor, the labourer and manufacturer, may be supplied with plenty of bread at a moderate rate. The plan is highly commendable, humane, and public-spirited. It is necessary, in some countries, but would not be proper in England, for the following reasons.

1st. On account of the great expence of erecting and managing such granaries.

2dly. Because the end proposed, would not be obtained by them.

3dly. The example of other states laying up corn in public granaries, does not prove the utility of them in England.

1. To



1. To form an idea of the expence of such granaries, it will be necessary to examine some of those in other countries, that are recommended for our imitation; such as that at Schoonbank on the river Elbe; which is three hundred feet long, and eighteen feet wide within; has seven stories, each story seven feet high, with a row of windows round each story, to be opened in dry weather to air the corn, and blow the dust out of it when turned. A path of a yard wide is left next the walls, all round the corn in each story; and another path across the middle, of two yards wide. In these are trap-doors, to let the corn run down from the upper to the lower stories, to screen and air it: whence it is drawn up again with cranes, or other engines. Stoves are likewise to be placed in the middle, and at each end of the granary, to dry the corn in damp weather. At first the corn is to be laid about six inches thick on the floors, and to be often turned, aired, and screened: in about a year it may be laid two feet thick; and the turning and screening being continued at proper intervals, it may, at the end of two years, be laid two and a half, or three feet thick: and being by that time perfectly dry, turning it once a quarter, will keep it sound many years.

This is the method proposed for preserving corn in England. But as we are assured, by M. Duhamel, in his treatise on the preservation of corn, that they usually lay it but eighteen inches thick in France, we cannot suppose it proper to lay it thicker in England, both on account of the greater moisture of our climate, and quality of the corn, which in wet seasons is not fully ripened in England, nor can it then be got in perfectly dry. And, though in hot dry climates, they lay it much thicker than in France: that is, because their corn is perfectly ripened; and their wheat of a different species from ours. The Lammas, which is generally esteemed in England, is a full plump fat grain; and, therefore, more difficult to be preserved sound: whereas, most of the foreign wheat, of the warmer countries that I have seen, is a drier and harder grain;  
and

and such were several parcels that I have received from Smyrna, Sicily, and Italy : being of the cone or bearded fort.

It is, also, to be remarked, that the quantity, which can be kept in such granaries, has been greatly over-reckoned. Mortimer has implicitly copied from Yarranton, and others from both, that such a granary as the above, would contain fourteen thousand quarters of corn. But a quarter, nine gallon measure, being 11.2 cubic feet, and each story, after deducting the paths round and across the middle, being only three thousand four hundred and fifty-six square feet, all the seven stories will contain no more than three thousand two hundred and forty quarters of corn, laid eighteen inches thick ; which is but about one-fourth of the quantity they have supposed. Mr. Dobbs is more moderate, when he reckons, in his Essay on the Trade of Ireland, that a granary of the above dimensions will contain fourteen thousand barrels ; but he supposes the corn to be laid two and a half, or three feet thick. He calculates the expence of erecting such a granary, built with bricks, and of a sufficient thickness and strength, at fifteen hundred pounds ; and eight or ten pounds a year each to six men, to turn and screen the corn, and forty pounds a year to a clerk. This calculation was made for Ireland about thirty-five years ago, but is much too low for England ; especially as such granaries are erected near cities and populous towns, where materials and labour are dear : for the building would cost considerably more in England, and the wages double : also the clerk would deserve a suitable appointment for the care and constant attendance necessary in a business of such trust and importance ; nor would one clerk and six men be sufficient, to do all the business, and also to take in and deliver out the corn : and therefore the clerk and men, at a moderate reckoning, would cost two hundred pounds a year.

But there is another article that Mr. Dobbs has omitted, which cannot, nor is it proper to be done by the clerk. One or more persons must be employed to buy the corn ;



which, at the rate of the usual commission for buying in private trade, will cost one shilling *per* quarter : to this is to be added the expence of fuel, of repairs, interest of money, and also for the waste of corn in drying and skreening, which, according to M. Duhamel's experiments, amounts to about a tenth part of the whole.

The expence of erecting granaries in France, is by this gentleman computed at a much higher rate than the above. For, he says, that a granary, to contain two thousand seven hundred cubic feet of corn, which is about two hundred and fifty quarters, will cost in France eight or nine hundred pounds. So that if the corn was bought at twenty-four shillings *per* quarter, the granary would cost near three times as much as the corn contained in it.

The principal corn, to be preserved in granaries, is wheat : of which, the quantity produced in England is uncertain. The author of the *Essays on Husbandry*, computes the wheat-barley and rye, annually produced, at near fifteen millions of quarters, over and above what is used for feeding and fattening cattle, &c. and for malting, distilling, and seed : and, as probably about a third part of these crops is wheat, the quantity of wheat remaining for bread, and other domestic uses, may be about five millions of quarters ; and this would be the provision of wheat for a year, to be laid up in public granaries ; besides rye ; and such other sorts of corn as might be kept for a short time. But I shall state a year's provision of wheat at no more than four millions of quarters, and charge nothing for keeping any other sort of corn.

I do not find, that those, who recommend public granaries, have determined what quantity of corn they thought necessary to be laid up in them. By the Signor Guastaldi's account, mentioned in No. 19, of your Second Volume, " the state of Genoa had always, in their public granaries, seven years provision of corn before hand." This seems to be a very ample provision ; and I shall, in favour of these granaries, suppose, that less than half this, or only three years provision, may be sufficient for England, at a  
medium

medium of the granaries being full when corn is cheap, and near empty in a dear time of the longest continuance. But to have this quantity always before-hand, or even less than this, it is necessary to provide store-room for more than three years provision, to be laid up in cheap times; and also room to spare, in order to lay the corn thin at first; and for it to run from the upper to the lower stories, when screened and aired. And, therefore, if we suppose, that room for only four years provision may be sufficient, this will also be allowed as favouring the scheme of granaries. But after all these abatements, to have room for four years provision of wheat at first, or when the granaries are quite full, there must be four thousand nine hundred and thirty-eight such granaries, as that above described: for so many will be necessary to contain sixteen millions of quarters.

To determine what advantage these granaries may be of to the public, we must fix some price for the prime cost; and, also, how much it may probably sell for. The markets are governed by the quantity produced; which, being variable, the prices will be so likewise; and the granaries cannot be always filled when wheat is cheapest. For, in that case, much more room would be necessary than is here supposed. But, in general, the granaries are to be filled, when wheat is under the middle price; and sold out when above it: and, therefore, the prime cost will be nearly the mean between the common and lowest prices; and the selling price the mean between the common and highest. These, according to Windsor market, for seventy-five years, ending in 1762, (admitting wheat to fall five shillings *per* quarter, upon discontinuing the bounty) are nearly twenty-six shillings and six-pence half-penny, and forty-four shillings one penny half-penny *per* quarter; and the difference between these, being seventeen shillings and seven-pence *per* quarter, is the profit accruing to the public from these granaries, upon so much as is sold every year.



How much this profit would amount to every year, is uncertain, as it depends upon the quantity sold in a year, which cannot be determined: but, if the whole quantity, lodged in these granaries, were to be sold once in seven or eight years, the annual profit would fall very much short of the expence: as will appear from the following state of it, *viz.*

|                                                                                                                                                     |                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| To first cost of erecting four thousand nine hundred and thirty-eight granaries, at fifteen hundred pounds each - - - -                             | £<br>7,407,000         |
| To three years provision of wheat, being twelve millions of quarters, at twenty-six shillings and six-pence half-penny <i>per</i> quarter - - - - - | 15,925,000             |
| To commission for buying, at one shilling <i>per</i> quarter - - - - -                                                                              | 796,250                |
|                                                                                                                                                     | <hr/> 24,128,250 <hr/> |
| To interest of this sum - - - - -                                                                                                                   | 1,206,912              |
| To clerks and men - - - - -                                                                                                                         | 987,600                |
| To repairs, fuel, &c. and waste of corn, above - - - - -                                                                                            | 305,488                |
|                                                                                                                                                     | <hr/> 2,500,000 <hr/>  |

Thus there is above twenty-four millions sunk, and two millions and a half a year expence. The profit upon the wheat sold, and the bounty together, will scarce pay half this expence: and though it is not pretended that this estimate is accurate in every particular; yet, if upon the whole it is any thing near the truth, the scheme of public granaries will not, I think, be either expedient or practicable.

2. The next thing to be considered is, whether, after all this expence, corn would be cheaper; and if it were, what effect this would have upon agriculture?

It has been supposed, that, upon discontinuing the bounty, wheat would of course fall five shillings *per* quarter; and likewise that the same quantity would be still exported. Now it is certain, that all the wheat produced in England, is either consumed at home, or exported: and, therefore, the wheat exported is all that can be spared for the granaries. The quantity exported yearly, at an average of twenty-five years, ending in 1756, was three hundred and forty-five thousand eight hundred and twenty-three quarters: so that, if all the wheat exported were to be lodged in these granaries, they would not be full in less than thirty-five years, even if none were to be sold out of them, in all that time: which is a further argument, that such granaries are impracticable; or, that, if they could be introduced, they would put an entire stop to the exportation; and, consequently, occasion a further and very great loss to the nation.

It is often said, in favour of these granaries, that they would be a ready market for the farmers, when corn was cheap. But the intention of them being to sink the price of corn in general, it is but poor encouragement to the farmers, that they must always sell at a low price. This, however, could be but temporary; for the bounty being taken away, the price sunk, and the farmers confined to one market, corn would become an unprofitable crop to them: for which reason they would undoubtedly raise less corn than they do now; and then, of course, it would be dearer. Those, who advise the bounty to be discontinued, and to erect public granaries, are sensible this would be the consequence: and, therefore, propose, that other encouragements should be given to agriculture in lieu of the bounty. But, till it is shewn what other can be given equal to the bounty, and a free trade, it will be safest to pursue the same measures, that have been found so long successful.

3. Though



3. Though it is the practice of several countries, to lay up corn in magazines, it may not be proper to do so in England. In large kingdoms, where the interior parts are remote from the sea, or navigable rivers, it may be necessary to save corn in magazines; and also in populous states, that have a small extent of territory, such as Holland. As the policy of the Dutch, in this respect, has been greatly magnified, and their example recommended for England, it may be proper to take notice here, that their circumstances being very different, what is necessary to one, may be not only improper, but very prejudicial to the other.

The province of Holland, though only about a fifth part larger than Kent, is computed to contain above two millions of people. The soil, in general, is of a bad quality, and improper for corn; of which it is reckoned, they do not raise enough for a tenth-part of the inhabitants. So that about two millions of them must have corn from other countries; and, therefore, they are under a necessity of laying up enough in magazines for their constant supply. But their magazines are not intended solely for the use of their own people; but also to lay up corn, when they can buy it cheap, to sell it again wherever they can get a profit by it. So that if they did not want to buy for their own people, they would, notwithstanding, have magazines of corn for trade; as they have for all kinds of merchandize: and, therefore, if we ought to imitate the Dutch in erecting magazines for corn; why not for all other goods, and make all our ports free?

And herein lies the mistake of those, who recommend the same policy for both countries, though their circumstances are widely different. Holland is but a small tract of bad land, and produces very little for manufactures, or trade. England, on the contrary, with about three times the number of people that are in Holland, contains about thirty times the quantity of much better land, in a better climate; and has a large native product, sufficient for the inhabitants, and, also, for a considerable foreign trade.

The land and product of England, are a large part of the riches of the state, and of individuals: and, therefore, in all deliberations concerning the public, they are to be considered; and land and trade are to be made subservient to each other, so far as is consistent with the good of the whole.

For this reason, public granaries cannot be for the interest of England, unless the benefit, arising from them to trade, were of more consequence to the public, than the loss occasioned by them, in sinking the value of land: which does not appear in the present case. But the bounty is advantageous to land, and to trade also, as may be seen from the following observations.

England was not considerable in foreign trade and shipping, till about 1600; nor had made great progress in husbandry. For money was then at ten *per cent.* and the current price of land was twelve years purchase. In these circumstances, no great improvements would be made: when those, who had money, could make ten *per cent.* of it without that trouble. The shipping was, also, very low at that time: for, by an account taken in 1582, by order of the lord high-admiral, there were then only two hundred and seventeen ships and vessels, above eighty tons, belonging to England: and about thirty years after this, not above three merchant-ships, of three hundred tons, and upwards: as we are informed by Sir Josiah Child, in his Discourse of Trade.

But, about 1660, trade had made a quick progress, interest of money was fallen to six *per cent.* and the value of land very much advanced; and it appears, by the table in my last letter, that wheat had risen above thirteen shillings *per* quarter: this was the consequence of a growing trade, for that makes every thing dearer. And hence it is evident, that to make corn cheap, a further encouragement is necessary, than what arises from trade.

Hitherto a considerable part of the trade of England had been carried on by foreign ships, and chiefly by the Dutch; and, for this reason, the Act of Navigation was made, to  
exclude



exclude the Dutch and others ; and to encourage English shipping. At the same time, an act passed, laying a duty upon corn imported, and permitting also a free exportation of it ; which, with the additional duties laid soon afterwards upon corn, and granting a bounty upon the exportation of it, laid the foundation of the improvements in husbandry, that have been made since.

The trade of England is now much greater than it was in 1660 : and though it has been interrupted by war, and other accidents ; yet, if upon the whole, it has increased in the last hundred years, as much as it did in the former sixty, the price of corn would have advanced in proportion, as in fact the prices of other things have done : and in that case, the mean price of wheat in 1662, would have been nearly sixty-nine shillings *per* quarter, whereas it was really less than thirty-nine shillings : and, therefore, this difference of thirty shillings *per* quarter, is clear profit to the public upon wheat ; and a profit in proportion, upon all the corn produced in England. — This is an important fact in the present argument ; nor is it material whether the price of wheat is so much lower as is here stated : but it is certainly very much cheaper ; and thence we may draw the following conclusions. First, that public granaries are unnecessary : for the end, that was proposed by them, is attained by the bounty. Secondly, the bounty does not make wheat dearer to our own people, five shillings *per* quarter, as has been supposed : but, on the contrary, they have it, by that means, thirty shillings *per* quarter cheaper. And, thirdly, this points out the reason of the demand for our corn abroad : as we can afford to sell it to foreigners forty *per cent.* cheaper, than we could have done, had agriculture received no other assistance, than it does from an extended commerce. All these sufficiently prove the utility of the bounty.

But it is objected, that now we are got into the tract of improvement, the bounty may be discontinued : this might be true in a profitable trade, wherein we had no competitors ; which cannot be said here : and it may be a sufficient

answer to the objection, to shew the danger of such an experiment in a parallel case. "A large bounty," says *Mr. Gee's Treatise upon Trade*, p. 212. "was given for several years, to encourage the making of pitch and tar in America, till it came to be imported in such vast quantities, that we had not only enough for our own consumption, but even to export to our neighbours; from which great plenty, we were ready to persuade ourselves, that the business was effectually established; and thereupon neglected the continuance of the bounty: since which, the importation of these commodities from Russia, Sweden, and Norway, is re-assumed."

Was it indeed true, what has been frequently asserted, in support of some favourite scheme, that foreigners must have corn of us, a bounty would be unnecessary, in respect to foreign trade. Thus, Sir Matthew Dicker, speaking against the bounty, says, p. 54, "The pretence of encouraging tillage, by a bounty on corn, can have no weight now, since our great improvements in husbandry: much less, if we erected magazines of corn in every county, against times of scarcity. *Foreigners never buy provisions till they want them, and then they must have them, whether we give bounties or no.*"

If this be the case, we have got the monopoly of corn; and may set our own price upon it: but, if we only fancy so, and should act as if it were real, we shall fall into a dangerous error. The profit upon corn exported, is a matter of great consideration to England, in a national view: but it is a strange conceit, that we have the monopoly of it against all Europe, though all that we export, is scarce sufficient for one-third of the people in the province of Holland.

Besides, it is well known, that all countries produce corn, from about twenty-five or thirty, to sixty degrees of latitude; and though we have no reason to complain, yet it is certain, that several other countries are more fertile than England; and that the principal reason, why all of them, of any considerable extent, do not produce corn  
enough



enough for the inhabitants, is a want of industry : which it is the interest of England to encourage, by supplying them with cheap corn.

Most of the countries in the Baltic, and Mediterranean, abound in corn ; and, from thence, the English were supplied, before they raised enough of their own. It is quite unnecessary to enlarge upon a thing so generally known : and, therefore, I shall only mention a circumstance, respecting the fertility of Barbary, spoken of by the curious and learned Dr. Shaw, who lived twelve years in that country. The soil is so light, that a pair of ordinary oxen usually plough an acre of it a day : “ and one bushel “ yields ordinarily from eight to twelve, though some “ districts may perhaps yield a much greater increase : “ for it is common to see one grain produce ten or fifteen “ stalks.” *Travels*, p. 137. This is a much greater increase, than is common in England ; and with this additional advantage, in favour of that part of Africa, that the corn is in no danger of receiving damage by wet : for there is seldom, or never, any rain there in harvest. But, what is still more remarkable, these plentiful crops of corn, are constantly produced without any manure. “ The “ plains of Africa,” *says our author*, p. 399, “ are never “ manured ; yet the same fertility in the soil, and the like “ plenty and abundance, that have been recorded of their “ crops, for above these two thousand years, continue to “ this day.”

If we look towards the Baltic, we shall not only find several large countries, that have been long noted for plenty of corn, but also some others, which may probably come in for a large share of that trade ; and very much sink the general price of corn in Europe. For, I observe, in your Number 23, for the month of July last, that among other countries, where your *Museum* is circulated, Russia is mentioned, where you remark, gentlemen, “ that great “ encouragement is given to agriculture.” If this is continued with spirit, it may have great effects, in regard to corn, and other articles of commerce.

The

The great river Wolga takes its course for many hundred miles through the fertile parts of that vast empire: and Captain Perry, who was employed by the late Czar, in several great works, and in different parts of that country, fourteen years, did at last take a survey of that river, in order to make a communication between it and the Nieva, that falls into the gulph of Finland, at Petersburg. This he found very practicable, and would have performed it, had not the ill-usage he met with, obliged him to leave the country. The great importance of this communication, he mentions in his *State of Russia*, p. 245. "If the Czar," says he, "lives to perform the communication, which it is his intention to make, for free water carriage, between the Wolga and Petersburg, he will then be able to bring oak and timber, with plenty of corn, to that place, at very easy rates: that the same may both pay a considerable duty to the Czar, and turn very much to the advantage of his country, by the being exported from thence to other parts of Europe: for corn may then be loaded much cheaper there, than can be delivered, either at the ports of Riga, Dantzick, or Koningsberg; from whence, and other places in the Baltic, the Hollanders alone, load every year eight hundred or a thousand sail of ships with corn.

"The Russes make the most part of their bread with rye, which they reckon to be the most strengthening for men: and in many places on the Wolga, between the mouth of Shackfna and Casan, rye is usually sold for the value of an English six-pence, or seven-pence *per* bushel, according to English measure: wheat is about nine-pence *per* bushel; and all other grain is there in price proportionable."

When these things are duly weighed, together with the improvements in husbandry now carrying on in many neighbouring countries; there is great reason to expect, that the general price of corn in Europe, will be lower than it has hitherto been; and of course a less demand for it from England: which will check the progress of English agriculture;



agriculture ; and hence the necessity of a public encouragement to tillage and exportation, and of introducing new methods and improvements. It is to those already made, in consequence of the bounty, that the farmers have hitherto been enabled to continue raising still larger quantities of corn, though the price has been sinking upon them for one hundred years ; and though, during that time, the price of labour, and of the necessaries of life, have been advancing ; as also the rent of land, taxes, and cost of implements of husbandry.

Though I am of opinion, that public granaries would be very prejudicial in England, I would not be understood to mean, that no provision should be made against times of scarcity. On the contrary, I think this highly necessary : but that such provision should be in the hands of private persons ; and more especially, of the growers of corn : and this for several obvious reasons ; but chiefly, because the poor are thus supplied at first hand ; and, therefore, in the cheapest manner. Likewise, as this is the most certain way, to prevent engrossing, in every degree hurtful to the public. For, of the several causes, that have been assigned of the high price of corn, there is none, in my opinion, so groundless, as that of its being engrossed by the farmers. That such a great number of persons, of small capitals, dispersed over the whole kingdom, who have no foreign correspondence, and very little at home further than their own neighbourhood ; that these persons, so circumstanced, can combine together, to raise or keep up the price of corn, is altogether incredible ; and contrary to every idea of engrossing.

By keeping wheat in ricks, the farmers lose the immediate benefit of the straw : and the corn is liable to be damaged, by vermin, and otherwise. Sometimes they have not convenient room to house, and thresh their wheat, when the market is rising ; and, at other times, they must pay an advanced price for threshing it. These inconveniencies might be avoided, if they had granaries to lodge it safely ; and it would then be ready for market, upon

the shortest notice. The granaries, contrived by M. Duhamel, are, in my opinion, by much the cheapest and best hitherto proposed; and very convenient for the use of farmers, or others, who might incline to lay up some corn upon speculation; especially if made of plank, and so constructed, that they could be easily taken to pieces, and carried from one place to another, where the owner might think proper to set them up again: and probably they might be contrived so as to be made larger or smaller occasionally.

But, whatever methods may be thought of, to preserve corn, in a cheaper or more compendious manner than has been commonly practised, they will not invalidate the objections to public granaries, as they lie against the whole scheme, for other and the strongest reasons, besides the expence. And, as it is of great importance to the community, that there should be corn in private hands, and in all parts of the kingdom, against times of scarcity, it is, I apprehend, a matter worthy of the consideration of the London Society, by what means the farmers and others may be encouraged and enabled, to preserve corn in a cheap and safe manner.

And, in order to promote this, by means of your *Museum*, it would, in my opinion, gentlemen, be very useful, to give an accurate drawing and description of M. Duhamel's granaries, with such improvements as you think proper; which would make the advantages of them generally known. And though these granaries, and the ventilators, &c. proper for drying or airing the corn to be kept, may seem strange at first, to many of those for whose use they are intended; yet as there is nothing of difficulty in them, more than in some other things daily practised in husbandry, a few premiums to introduce them, and some examples of the utility and benefit of them, would overcome all prejudices; and they would in time come into common use, to the great advantage of the public.

I am, GENTLEMEN,

April 29, 1766.

Your most humble servant,

E. S.

N U M.



## NUMBER LX.

*Further Considerations on the national Advantage of the Bounty  
on Corn : In a second Letter from E. S.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

THE author of the letter, No. 30, in your last month's publication, signed a Manufacturer, has made objections to some particulars in mine concerning the bounty in corn : and though, I think, they fall short of the argument, a reply to them may serve as some further illustration of this subject.

That the exportation of corn tends, at intervals, to enhance the price, is admitted ; but this has not hurt the poor, as he supposes : for the price is not now so high, as formerly, either in particular years, or upon a medium. In the dear year 1740, wheat was fifty shillings and eightpence *per* quarter at Windsor market. By examining the prices, at the same market, for sixty-nine years preceding 1662, it will be seen, that twenty-seven of these years were as dear, and several of them much dearer than 1740. But that, in the last one hundred years, ending 1762, there were only eighteen of them so dear as 1740. Thus, in every five years of the first period, two of them were as dear as 1740 : but in the last period, only two in eleven were such dear years. Does not this demonstrate, that the encouragement given to tillage, and exportation, has been a great benefit to the poor ?

The tragical story, related by him, to gain any credit, ought to have been supported by some better evidence than hear-say : the place should have been mentioned ; and why it happened so there in particular. Would he insinuate, that the poor in general were starved in 1740 ? Or, can he name a parish in England, wherein fifteen hundred poor

people died in so many months for want of bread? Such shocking stories have a very bad tendency; and can be invented for no other purpose than to inflame the minds of the poor, under a pretence of compassion for them.

I shall not charge your correspondent with having such a bad design: but I must acquaint him, that his hearsay is false history: and, therefore, that the consequence he has drawn from it, falls to the ground. His mentioning a parish in the west, points to the woollen manufacture. The stagnation in that manufacture, was not in 1739 or 1740; nor was it in consequence of the dearth of corn: but it was before either of those years; and when corn was not dear.

To make this clear, I must observe, that great complaints were made of the decay of the woollen manufacture, for several years before 1740. Several pamphlets were written on that head, applications made to parliament, and various causes assigned for this decay of trade. The clothiers attributed it to the running of wool, the high wages of their workmen, and their idleness and debauchery. The workmen alledged, that the clothiers oppressed them, that they had combined together to sink their wages, and obliged them to take goods in truck, at exorbitant prices, &c. And in 1738, there was a riot at Malksham in Wiltshire, where the goods of some clothiers were destroyed; for which three of the rioters were executed at Salisbury.

The stagnation of trade was not attributed to the dearth of corn, either by the clothiers or workmen: nor could it be so with any reason. For wheat was but about four shillings and six-pence *per* bushel at Windsor market in 1737 and 1738: and it was then, that the complaints run highest of the badness of trade; and that a general address was made to parliament by the woollen manufacturers, complaining of "the sinking state of the woollen  
" exportation trade, humbly represented by the British  
" manufacturers, 1737." Wherein they say, "Your  
" honours are fully apprised, even by your tenants, that  
" the



“ the effects of a declining trade are now generally felt,  
 “ *and no cause can be ascribed*, but the great decay of our  
 “ woollen exportation trade ; and that evidently owing to  
 “ the British and Irish wool exported.” Your correspon-  
 dent may here perceive, that, by blending together dates,  
 and facts, which have no connection, he has given a very  
 partial account of this matter.

He says, a dear year causes a stagnation of trade : others  
 say the contrary. For this, I shall refer him, to a pam-  
 phlet, entitled, “ *The case between the clothiers and weavers,*  
 “ 1739,” written by a *manufacturer* ; who brings sundry  
 arguments to prove, “ that low wages, or high provisions,  
 “ promote trade : and are also beneficial to the workmen.”  
 One passage will be sufficient for a sample. “ The best  
 “ goods, says he, “ are made in the worst times : when  
 “ employment is scarce, every manufacturer endeavours  
 “ after perfection in his particular branch, for fear of be-  
 “ ing dismissed. In dearth of provisions it is just the  
 “ same. If wheat sells for ten or twelve shillings *per*  
 “ bushel, the manufacturers are obliged to work more,  
 “ and debauch less.”—It seems, that this argument about  
 trade, proves against the farmers, that provisions ought to  
 be cheap ; and against the workmen, that they ought to  
 be dear.

In 1739 or 1740, he says wheat sold for ten shillings ;  
 and in 1742 or 1743, for two shillings and six-pence *per*  
 bushel : “ and hence,” he adds, “ appears the absurdity  
 “ of an immoderate price. For, in this manner, it will  
 “ ever tend to sink itself, and avarice be justly rewarded.”

By this, we are to understand, that the farmers are en-  
 grossers of corn ; and that they had an immoderate profit  
 upon it in 1740. But, if they got so much by it then,  
 they were, no doubt, the better able to engross it after-  
 wards : and he will not doubt their inclination. Why  
 then did they not engross it the last of these years, as well  
 as in the first ? For if we suppose that the crop in 1742,  
 was four times as great as in 1740, this will not remove  
 the difficulty. They could as well have engrossed four  
 bushels

bushels at two shillings and six-pence, as they could one at ten shillings. Hence, therefore, appears the absurdity, not of the immoderate price in 1740; but of the notion, that it is in the power of the farmers to engross corn.

Your correspondent has hit upon a convenient method of taking an average, by throwing out the dear years, because they did not suit his argument. Probably the farmers, as parties concerned, and who, he acknowledges, never paid higher rents than now, may think they ought to have the same liberty, of throwing out the cheap years; and then we shall be just where we were. But he must allow me, to tell him, that the consequences resulting from a just comparison of the prices of corn, before and since the bounty, are of too great importance to the public, to be thus trifled with. It is from thence evident, that corn has been much cheaper than before; and this not by any oppressive measures, and sacrificing the interests of one part of the community to those of the other, but by encouraging a general improvement, to the advantage of all. This, it might be imagined, would meet with a general approbation: and, doubtless, it will, by all who impartially consider it.

My letter does not say, that the exports of corn were but one million two hundred thousand pounds in ten years: but that they were so much *upon an average* of ten years; and page 20, that so much was gained *every year* to the nation. Nor does he take any notice of the freight; or that the corn exported employs one hundred and fifty thousand ton of shipping.

What I said of all other things advancing in price, except corn, was meant of all things, that denote the dearth of living; and for that reason I instanced the price of labour, which is one of the most certain rules of judging the rate of living in every country: several others being more or less indeterminate. The prices of many manufactures are variable, depending upon the dexterity of workmen, their quality, the fashion, and the demand for them at home or abroad. But as corn is undoubtedly  
cheaper



cheaper than formerly; and bread being a large article of consumption in a poor man's family; if "every species" and kind of manufactures are also cheaper," whence is it, that labour is dearer? Do not the manufacturers and farmers pay more for labour than they did one hundred years ago? I am afraid, therefore, these cheap manufactures are chiefly for luxury: and that the poor are not much benefited by their cheapness; though they are greatly so by the cheapness of corn.

I shall pass over your correspondent's indecent reflection, for which there is not the least foundation in my letter. It would be easy to retort, where there is so much room given; but I forbear, in regard to your work, which I wish always to see filled with more useful matter.

I am, GENTLEMEN,

May 12, 1766.

Your very humble servant,

E. S.

## NUMBER LXI.

*A further Account of the Uses and Advantages of the double Plough; particularly in the Cultivation of Horse-Beans: In a Letter from Mr. Randall.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

**I**N my letter \*, *Number 34 of your Museum for last April*, I informed you, of the construction of, and mode of culture by, the double plough, there recommended: but as what I then said was only a small part of the system of experi-

\* We are extremely obliged to Mr. Randall for this communication; as well as for his former letter on the same subject: and we are much pleased to find, that the account of the double plough, which of itself was very specious and ingenious, is authenticated by the name of a gentleman, whose great experience, and adherence, to just and rational principles of theory, cannot fail to recommend and promote the more general use of it. E. O.

ments

ments I had made with it—I shall, as my time will give me leave, and I hope it will every month, send you the courses of farming, in which that instrument is greatly concerned. The important objects, I ever had in view, were the destruction of the weeds; the deepening and refining the soil according to the garden culture; and the preparing it to sow wheat, barley, and oats, in the broad-cast mode of delivering the respective seeds. I told you, that plough would work very well in all soils, which are not of the stiffest nature: but, if a farmer is possessed of the spiky roller, mentioned in your last Museum, Number 53, it is inconceivable what satisfaction \* he will have in the use of the

\* This plough, and the spiky roller, will certainly, in many cases, afford a mutual aid to each other, in the expediting a good tilth, where obdurateness of soil, and unfavourableness of weather, deny that consequence to the common methods of practice. That, exposure of soil to the air, is necessary to that mode of fertilization, called fallowing, is allowed by all: that, repeated stirring of the ground, is essential to this exposure, is self-evident: and that, such stirring cannot have its due effect, where the ground is only turned up in large clots, is equally certain. A plough, therefore, which shall have the effects of two stirrings at one going over the ground: and a roller that will always remove the impediment to this operation, which arises from the clotting of clayed land in dry seasons, cannot but afford both a facility and certainty of reducing the soil to a most improved state. It were much to be wished, that this method should be adopted, at least experimentally, in many different parts of the country, by gentlemen who are promoters of improvements in agriculture. For the principle, being fertilization by mechanical aid, renders the consequences of the advantage, gained by the method, much more interesting to the public, as we have formerly observed, than any method founded on the use of manures or compost. Dung is limited in quantity in all places: and lime, marl, peat-ashes, &c. are confined to particular parts. But the use of machines, of simple construction, cheaply purchased, and easily used, has no restrictions: and where they are introduced into general practice, and afford greater crops, the consequence to the public is the same as if the soil itself had been proportionably improved. In this light, the mechanical improvements claim the greatest attention from the public, especially at this time, when provisions are grown extremely dear, from causes, that, in all probability, will still increase in their influence; and can only be counteracted by adequate improvements in agriculture. E. O.

double



double plough, let his ground be never so stiff. And here I must beg leave to observe, that the expence of the spiky roller, will, to my own knowledge, be soon repaid by the savings in clotting, were this its only use. Let us now suppose the stiffest soil thrown up to be fallowed, and ploughed once over before winter with the farmer's own plough; and then immediately thrown up in ridges with the double plough. Great care must be taken, during the dry part of the winter, to bout these ridges off; by which means the ground will have had three stirrings: one with the common plough; and two with the double plough. On the first opportunity in the spring, when the ground is fit to bear the horses tread, level it with heavy harrows: but if the soil be quite dry, let the spiky roller be drawn twice in a place the long way of the ridges, before the harrows are used; which they may be, with yet more effect, if the ground will admit them to be drawn across the ridges. In either form of harrowing, let the roller again go twice in a place. Now take the double plough; and draw out a furrow about three inches deep: and let the seedsman throw in horse-beans, following the ploughman to the head-land: where, let him guess his ground in coming down again, so as there may be full three feet of space from the edge of the first furrow, to the near edge of that he is now going to make: which the seedsman is to supply, also, with the seed-beans. And so on throughout the field. By this it will necessarily come to pass, that the ground will, in appearance, be only one part in three supplied with seed; which one part, the farmer may cover, by turning a light furrow on it, with his common plough; and level the earth over the seed, by letting the spiky roller, drawn by a team of three horses, one before another, once in every other three-feet space, which is unsown. By this means the roller, being seven feet in length, will, with its ends, over-reach the two sown furrows, one on the right, and the other on the left-side of the horses; and, consequently, there will be great dispatch in this operation of levelling the mould over the seed.

And now the worthy farmer will conceive, that his surly clay soil is well prepared for the reception of his horse-beans. I hope his good sense will detest, the nonsense, of an opinion, that bestowing a little more labour on his ground for the growth of this vegetable, is throwing his money away. Let him ask any gardener; and he will tell him, the better he prepares the ground, the larger will his crop be: or, if he attend to the practice of gardeners in growing Windsor-beans, he will be soon cured of that unprofitable custom of sowing horse-beans on a rough tilth. Wherefore if common sense, and not tradition, take place, he will give his seed the best chance of being nourished to its destined maturity; which is its natural bias; but requires a finer tilth, or preparation of the soil: as then the shoots beneath the surface can easily extend, and disperse themselves, in quest of nourishment, to be conveyed up to the plants above ground. On the contrary, let the soil be very clotty, and the consequence will be, that these shoots cannot penetrate the hard lumps, any more than they can pierce through stone-walls, to extract the vegetable principles, necessary in the growth of plants. To depend, while the beans are growing, upon the rains washing or mouldering away these hard clots, is, what a sensible farmer will wonder at, when he discontinues the custom of thus injuring his crop, himself, and the public. But suppose the rain should thus besfriend him, he knows what a sad situation his beans are in, when there comes a parching spring and scorching summer. Let him then view a fine tilth, and a rough one. The first keeps the beans in motion; and makes them look in perfect health: because they do not want nourishment, as the dews sink into the loosened soil. But the other discovers great distress: as they receive no succour from the atmosphere, unless the dews could penetrate such surly clots; which is utterly impossible.

We shall now suppose, the beans have made their appearance above ground; and plenty of weeds with them. Let the beds of beans be now weeded; and, the proportion



portion of such weeding will be, the third part of an acre. The weeds are come up again.—Weed a second time.—They are come up a third time.—Destroy them again: and then you will have weeded one acre; with this difference, that the people stand in the unfown spaces; and, therefore, can do no harm to what is growing. But, in the common way of weeding, no body will undertake to say, that there is no injury done to the vegetable crop: or that the ground is not made worse: as the people's tread makes that closer, which was too close together before. We have now done weeding the beans. — The spaces are next to be taken care of.—Turn a furrow from the beans, with your common plough; and go the usual depth: but go as near the plants with the share point as you can, without damage to them. The consequence of thus turning a furrow will be, that, as the space was three feet wide, you will leave a ridge in the middle; and the ground beneath will not now be stirred. If you find it necessary, that is, if the weeds in the spaces are making a formidable appearance, you may perform this operation of throwing up this ridge, any time before the last weeding the beans. It is no more, than just to make these weeds turn to your advantage, for all the great mischief they may have done you. To your profit they will thus most certainly turn: as there are the same chemical principles in them, proper for the growth of plants, as are found in dung; but, in a less proportion: and, therefore, the weeds being now buried under the ridge, they will bring on a fermentation; and enrich and refine the soil within their reach. When you think, the weeds under the ridges are putrified, take the double plough, and split the ridges; and, in so doing, you will earth up the beans: but take care you do not overthrow the mould, by raising one hand higher than the other. Keep but the sole of the plough level in the ground; and you may go the usual depth. And now the mould in the spaces is properly exposed, to receive the influence of the atmosphere. Let the weather happen, as it may, you will be in the way, to meet a gracious Providence, according

to his own appointment : who has laid up his treasures for us in the atmosphere, if we have but the sense to make preparation for their reception. If the weather be a continued rainy season, the beans, in their present situation, will be wonderfully pushed on to maturity. If it be a scorching summer, the loose mould will imbibe the dews ; and give vigour to all the plants within their reach. But, if, in a very wet summer, the weeds should again appear in the spaces, run the double plough up and down them : and, letting the share have a little earth, you will by this means smother your enemies : which can do you no more harm after this operation. Now, as this stiff soil, when well prepared, is four times as rich as the lighter lands, you may, from what has been done, expect a fine crop of beans : notwithstanding the ground may appear, in the most flourishing state, of the beans, at their full growth, to be only half covered over.

I am, GENTLEMEN,  
Your obedient servant,  
J. RANDALL.

York,  
June 17, 1766.

[To be continued.]

*P. S.* If the editors are pleased to insert this in their next *Museum*, I shall send you another letter \* : and so on, whenever I send you any thing. Because, as I keep no copies of my letters, I cannot go on, without seeing the last I send you every month.

\* The editors will be very much obliged to Mr. Randall for his future correspondence, according to the manner of his kind offer ; and though they will not have the opportunity of inserting the pieces monthly, they will give them a place in the periodical volumes they intend to publish. The first of which will be in January. If Mr. Randall will, therefore, favour them from time to time, the printed copy of each respective piece shall be sent to him as soon as worked off : and then there will be no difference, but that the public will have more of his system laid before them together, which may perhaps be rather a convenience than a disadvantage ; as one part will, in all probability, tend to illustrate the other. R. E.



## NUMBER LXII.

*Observations on the proper Manner of cultivating Flax, for the making very fine Thread; on the making Cloth of Hop Binds and Nettle Stalks; and on the applying the fibrous Part of the Stem of the Plantain, to the making Cordage, Fustians, Lawns, Knitting Work, Gauze, and Candlewicks: In a Letter from Agricola.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

ON seeing your advertisement, at the end of your last Number, declaring your intention to discontinue the Monthly Publication of your *Museum*; and for the future to give periodical volumes, containing such matter as may be collected in the intervening months, and beginning next January; I was induced to write an additional letter to that, which, I had before sent you on the boorcole, concerning some other articles: which tho' they do not require a long discussion, are yet of some importance in their nature.

The improvement of manufactures, which depend on very fine thread, are of great consequence to this country; because they employ women and children: and are carried on, therefore, by means, that do not take off the strong and able hands, who ought to be employed in our present staple manufactures; or in agriculture. The general political advantages, as well commercial as moral, of profitable means of employing such hands, I have before pointed out in my letters on the production of silk in England, inserted in your last February number. With respect to those manufactures, particularly, in which fine thread is used, we are happily in possession of some at present; there being now very considerable quantities of lace, as well imitations of the fine Mecklin and Brussels kinds, as  
minionet,

minionet, made in some parts of Great Britain; to the saving of many thousand pounds a year, which would be otherwise paid to foreigners for that article: and we have the further satisfaction of seeing this manufacture still increasing. But while we are thus using great quantities of thread in this way, we are obliged to have the finest kinds wholly from foreigners; and when we employ our own, in cases where great fineness is not required, we sink a considerable part of the value of labour, by producing what must sell at an inferior price than the foreign, on account of its want of equal strength; owing to the inferior quality in that point of the flax of which the thread is made. This is certainly a great disadvantage to the public; because we not only pay very great sums for the finest part of the thread used for lace to foreigners; and besides the loss of so much in ballance against us, inance, by this means, the price of the manufactured articles to the impediment of the sale: but, by the use of our own for less fine lace, check, likewise, the increase of the demand, by its inferiority in the most important of all qualities, strength and durability. If these disadvantages were irremediable, from any natural or political reason of soil, climate, want of hands, &c. we must certainly submit to it. But there is no such obstacle; for flax, proper for the finest thread, may be produced here, as well as any where: and there is nothing in the art of spinning, that would not be soon attained by our people in perfection, were they induced to apply it: as specimens have proved. Moreover, instead of a want of such hands, as are most fit to be employed in this work, there is unhappily much too great a redundancy of such of them, as are now wholly idle.

One principal impediment, however, to the producing very fine thread, or moderately fine of due strength, in our country, has been, as was intimated above, the defect of proper flax: and the removing that, is the first necessary step towards the acquisition of the whole. This is, in its nature, a very practicable matter: as it arises from nothing, but an ignorance or neglect of using the due means. For



flax, such as is raised for the very finest thread in Flanders, may be any where produced by art in the cultivation : and there are places in Great Britain, where, from natural accidents, without the exercise of that art, such flax, as will come near that kind, may be produced even by common means of culture : as I shall more particularly show below. The artificial means of producing flax, in the way pursued in Flanders, have been put in practice here, for the use of the cambric manufacture lately carried on. Had that manufacture been permanently established, and there was reason, to hope, that the knowledge of this art would have been thence propagated, and the method applied more generally to the raising flax in the same manner for other purposes. But the discontinuance, as I am informed, or at least the very languishing state, of that undertaking, has removed the ground of these hopes : and is likely to leave us as destitute of those means, as we were before. This has induced me to be desirous to communicate more generally, the method of executing this improvement ; and to record it in your collection : that, if no present use shall be made of it, those who may hereafter engage in undertakings, where fine thread is necessary, may have the encouragement and aid of it.

The manner of producing fine flax, by a peculiar method of cultivation, is simple : and so are the principles on which the difference of the production of this, or coarser kinds depend. In order, however, to render the comprehension of the manner more easy, I will first explain those principles.

The difference betwixt the coarser, and finer kind of manufactured flax, obviously consists in this, that the fibres of the fine are naturally less thick, and gross ; and likewise of a less ligneous or woody consistence : whence being less hard, and rigid, they are not so soon snapt, or broken by violence in the wear ; and the thread composed of them is, consequently, more durable. This flexibility and toughness, which is the result of their being less woody and stiff, contributes, as well as the smallness of the  
the

the fibres, to that superiority, which is found in the foreign fine flax. This difference in the fineness and consistence of the fibres, might be naturally supposed to arise from the seminal difference in the kind of flax itself: as there are several species of flax, as well as of many other plants; and consequently such a difference might well be. But this does, nevertheless, not happen to be the case; for the fine manufactured flax is really the product of such crude flax, as is raised from the common seed. The difference is, therefore, owing to some variation in the method of culture; or to the accidents of soil and air, in the place of cultivation, as the facts themselves evince. Whatever will check and retard the growth of flax, and prevent its being vigorous and strong, will prevent the fibres from becoming large and woody: and this may either be, the natural poverty of the ground, and chilliness of the air; or the raising such a multiplicity of plants together, as the ground cannot support, so as to bring them to their full strength and ripeness: in consequence of which, the plant is more replete with a watery succulence, and less with the mature gummous or resinous juice; which renders the fibres woody. On this foundation, the art of producing fine flax is formed: and the particular means, by which the end is effected, is as follows.

The ground is prepared, as in other cases; but only a number of flakes, of the height of a foot and a half, or two feet, with forked or branching parts at their tops, are driven into the ground: the more forked or branching parts the flakes have, the better they will answer the purpose. The seed is then sown in the usual way, but in a much greater proportion: even three or four times the common quantity has been used. Over the flakes, are then laid bushes of an open figure, that bear upon the forked parts of the flakes; and spread over the whole ground. The flax, of course, from the great quantity sown, comes up extremely thick: and, rising among the bushes, is supported there; and grows up among them, till it be of due maturity: when it is got off the ground as other flax, and freed from the bushes. It is then rotted,  
and



and dress, as other flax; except, that being very tender and succulent, much less time and more caution is required to avoid the rotting of the fibre, as well as the pulp of the herb: and that a gentler management is to be observed in the breaking.

The reason of this treatment of the flax, in its cultivation, may be easily deduced from the above principles. The sowing so thickly is to make it rise in a greater quantity than the ground can maintain in full vigour; and, consequently, to occasion it to grow weakly, and run up small: by which means, it is kept from the hard and woody state. The use of the stakes is to support the bushes; and the use of the bushes, to support the flax, and keep it from being laid on the ground, as it otherwise would be, being so weak and small, by the wind and rain; and consequently to save it from being rotted before it be ripe.

This is the method; and very effectually it answers the purpose. As I have seen, in the actual comparison of flax, raised by this method, and the common, in the same neighbourhood: some specimens of which, Mr. Norton, the conductor of the English cambrick manufacture, produced to a committee of the London Society for promoting arts, in the natural state, as pluckt from the ground; in that of manufactured flax; and in that of spun yarn, and thread.

What is here directed to be done by art in general, is performed by nature in particular places. For last winter, Miss Leslie, who, with her sisters, have some years been attempting the establishment of a manufacture of fine thread in Scotland, laid before the London Society some specimens of yarn and thread spun from flax, produced in the neighbourhood of Hamilton; which flax appeared to be capable of making exceeding fine thread, of as strong a texture as the best brought from Flanders. In the raising this flax, nature, through the peculiar circumstances of soil, and air, did the offices of art: the poverty of the ground, and the coldness of the atmosphere, bringing up the flax small and weak, without any other deviation from

the common method of culture, than the sowing the seed somewhat thicker than is usually done. There are, doubtless, many other parts of Great Britain, in mountainous barren cold places, such as Wales, Derbyshire, Northumberland, &c. where ground, that at present affords none, or very little advantage, would yield crops of this very valuable species of flax : which would, also, employ the half-starved male inhabitants of such parts, in breaking and dressing ; and the female, in spinning it : by this means, the present manufactures would be aided, and fresh ones established, to the great advantage of the public, as well in the saving money now paid to foreigners for thread, in its simple state, or fabricated into lace, lawns, &c. as in the increasing the number of industrious honest inhabitants.

From the endeavouring to establish the production of flax, for the finest kind of thread, give me leave, now, to make a transition into the other extreme ; and revive some designs to provide a coarse, and very cheap kind of product of the same general nature, that would tend to the emolument of the public, by employing some of the idle hands at home ; preventing the importation of foreign hemp and flax ; and furnishing cheap and strong cloathing for the poor. This is, by the dressing, in the manner of hemp or flax, the stalks of some herbs, which are cultivated in great quantities for other purposes, or grow spontaneously ; and substituting them in the place of hemp and flax, for the making coarse cloth, of the nature of linen.

The most promising of the kinds, which are cultivated for other purposes, is, the *hop binds* : which, by proper management, afford a very good and strong kind of coarse cloth, like linen. In Sweden, and Denmark, there are actual manufactures of such cloth ; which are profitable to the peasants, who carry them on. The London Society, for promoting arts, from a conviction of the truth of this fact, and in consequence of a memoir in the acts of one of the foreign societies, displaying a general account of the making this cloth, offered premiums for the introduction



tion of it here : but the particular treatment of the hop-binds, previous to the spinning, not being known, nor perhaps any attempt made by persons, who were well versed in the general knowledge of these matters, no candidates presented themselves ; and the Society discontinued the advertisement.

There is no doubt, however, but this difficulty of bringing the hop-binds to a proper state for spinning, would be soon removed by trials, undertaken by those, who are well acquainted with the management of flax and hemp : for, certainly, a failure can only happen, from mistaking the proper time of rotting, which by a few experiments would easily be ascertained, if constant essays were made of any quantity taken out from the water, at successive periods, and examined by those who understand well the method of breaking hemp and flax. Considering the quantity of hop-binds, produced together in some counties ; and that at present they are of no other value, than any other dead weeds ; certainly were they applied to this purpose, they would yield a very proper employment, in dressing and manufacturing them in winter, for those, who are engaged in the cultivating, and gathering them in the other parts of the year. Another herb, among those, that grow spontaneously, and may be used for such purposes, in the place even of very good flax, is the common, and other *net-les*. If the stalks of them be well managed, they may be manufactured into a very fine and strong thread : and there is a lady well known for her ingenious literary performances, who carried this art to great perfection in Ireland ; and produced some very extraordinary samples of manufactured articles.

If the common people were well informed of the methods of managing any materials, which they could obtain without expence, and of rendering them certain return of profit by their labour only, there are, no doubt, among those, who at some times of the year are greatly distressed, and yet can find no work if they would do it, many, that would be very glad to turn their hands to such

manufactures ; and their success would as certainly lead others to the same attempts.

So much at present for the production of materials in our own country, for the improvement of thread, lace, &c. Next to the obtaining them at home, to the exclusion of the foreign, we should have regard to our colonies. Among the various discoveries and inventions, relative to such matters, which might be of service to both the colonies and ourselves, if duly prosecuted, there have been none more specious and promising, than the application of the fibrous coats of *the stem of the plantain* : of which specimens of various manufactured articles were produced to the London Society about four years ago. These specimens appeared so perfect, according to their respective nature, that the Society was induced, without the least hesitation, to offer premiums for the introduction of the several manufactures of such articles here : and to the advertisement of these premiums, they prefixed the following preamble.

“ Whereas the *stem* of the Asiatic and American fruit,  
 “ *bearing plantain*, affords three sorts of fibrous materials ; which resemble hemp, hard silk, and cotton : all  
 “ which have been experimentally found capable of being  
 “ wrought into various sorts of manufactures ; and,  
 “ among others, into cordage, fustians, lawn, knitting,  
 “ gauze, blond lace, and excellent candlewicks ; sundry  
 “ specimens of which manufactures, may be seen in the  
 “ hands of the register of the Society, &c.”

When the advertisements for these premiums were resolved on, a gentleman, who had some concern in the West Indies, proposed to have procured a considerable quantity of the plantain stems ; in order, that the Society should have distributed it, among those manufacturers who might have been willing to make trials of it. But this not being executed, the difficulty of procuring them has, in all probability, been the occasion of a total neglect of any attempts in this matter : and no candidates offering, the Society has since discontinued the premiums,

As



As this is no where registered, but in the Societies books, being given up before you inserted their premiums, and articles so far back are not likely to be seen there, but by very few, I am extremely desirous, it should be preserved in memory by your collection: where it may incite some public-spirited person of fortune, or ingenious artisan, to make some effectual attempt for the establishment of a manufacture of these materials: which could not but be productive of national advantage, as well to the colonies as ourselves, if they could be introduced into use.

The diminishing the importation of foreign hemp, silk, and cotton, or of any of them, would be a public benefit, for reasons, which we have before touched upon; and which are, indeed, obvious enough of themselves: and there are very great quantities of the plantain continually cut down in our West Indian colonies, of which the stems, that are very large, are now thrown away, as useless matter.

The cheap rate at which they might, therefore, be obtained here, at least in a prepared state, where a great part of the freight of the raw material would be saved; and the beauty and strength of the gauze, blond lace, &c. even in the above-mentioned samples, which were made only in the way of experiment; give the greatest reason to believe, that a manufacture of them might be profitably established here, and employ part of our idle women and children.

But never, among the common people, by their own means, can such matters as any of those I have above explained, be originally introduced. It must be, by the encouragement and assistance of persons of fortune, and more general knowledge; that new arts must be transplanted into any neighbourhood, and for some time duly protected and nourished. There is, in our own country, at present, the greatest and most active spirit of charity in making, provision for the indigent and diseased poor: but how much more effective is the preventive relief of providing constant work, and diffusing the disposition to industry, which

which eradicates the cause of poverty; while the temporary palliation of supplying scantily the present wants, does but in fact diffuse the evil? In a nation, where at present humanity inspires the motives, and good sense directs the manner, we may surely hope, in a short time, to see an attention, in persons of condition, to add to the prosperity of their country, and the happiness of their neighbours, by such attempts. The Societies, in particular counties, or neighbourhoods, of which, besides those I formerly named, another is now forming in one of the most rich and populous parts of England, will have a great opportunity of, and certainly proportionable effect in, promoting this view: to which also I hope your publication, in the new mode you have resolved on, may, by their means, be made greatly subservient. I shall, on all occasions, be ready to contribute my mite, and will readily acquiesce in such changes, as you shall find most commodious, in the manner of laying what I may communicate to you before the public.

I am, GENTLEMEN,

Your humble servant,

AGRICOLA.

### NUMBER LXIII.

*An Account of the instantaneous Improvement of Land, by turning up the Soil from two Feet depth, with the Aid of two different Kinds of Ploughs: And of the Structure, Manner of Use, and Expence of the respective Ploughs: In a Letter from Mr. Randall to the Editors.*

*To the Editors of the MUSEUM RUSTICUM.*

GENTLEMEN,

I Shall take it as a favour, that you will be pleased to insert what follows, as soon as you receive it: because there will be the more time between this, and wheat-seed time at Michaelmas, for gentlemen to determine what to do,



do, with respect to the proposed improvement: otherwise nothing can be carried into execution, relative to it, till that time twelvemonth.

As there is frequently an excellent soil beneath the reach of common ploughing, which, if it could be brought upon the surface, would produce vigorous and plentiful crops, without the assistance of dung; I here beg leave to acquaint gentlemen, who delight in improvements, that they may be supplied with a set of ploughs, for turning up the soil, in an adequate manner, and with directions to the ploughmen how to use them; at the following prices.

*For one Foot depth.*

- |                                                                                                                                                                                                                                                                                                                 |                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| 1. <i>A loosening plough</i> , that goes one foot deep, without either mould or land boards: but only a broad wheel, (under the beam) and its proper share, coulter, &c. so as to cut the ground eighteen inches wide; leaving the soil in its place, but loosened and prepared for the second plough - - - - - | } l. s. d.<br>15 15 0 |
| 2. <i>A lifting plough</i> , (with a broad wheel under the beam) to gather up the soil so loosened; and make a clear trench, eighteen inches wide, and one foot deep - - - - -                                                                                                                                  | } 10 10 0             |

*For two Feet depth.*

All things to be performed with the two last ploughs, to the depth of one foot, and breadth of eighteen inches: then the first plough is again to loosen the soil one foot deeper; and afterwards,

- |                                                                                                                                                                     |           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| 3. <i>Another lifting plough</i> , with a broad wheel under the beam, gathers up the soil; and throws it upon what the second plough had raised up before - - - - - | } 10 10 0 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|

|                                                                |        |
|----------------------------------------------------------------|--------|
| The whole expence in ploughs, for two feet depth, is - - - - - | 26 5 0 |
|----------------------------------------------------------------|--------|

Now,

Now, it is easily conceived, that, when the upper *stratum* is tired and foul, the owner may, instead of fallowing the ground, turn down the worn-out soil, and perpetually enjoy a fresh *stratum*, as the weeds in general, by being buried so low down, will ferment, putrefy, and turn to tillage. From hence a judicious person will infer, that the expence of these ploughs may be soon more than repaid, in the advantage of an unexpected crop without dung.

Those, who can get these ploughs against next wheat-feed time, may depend upon an excellent crop of wheat, if they have the opportunity which happened to me, particularly on sixteen acres, that produced at the rate of forty-eight bushels an acre, without dung. The ground, which was good, but very foul and run out, fell the harvest before into my hands: so that I lost no time, but sowed the wheat-feed the Michaelmas after.

The reader will infer, that if all the deep and good land in the kingdom, was turned up after harvest; and sown with wheat seed, instead of being fallowed, great would be the consequence to the public. There need only the two first ploughs for this operation; the third not being wanted till the fresh soil has run its courses of crops: which must begin with wheat, as I doubt whether any other grain will so well take the lead.

Lest any ploughman should throw difficulties in his master's way, it may be observed, that after the first plough has loosened the soil, the second always has the ground loosened, with an open furrow to the right; and, consequently, this management of the land differs in nothing from common ploughing; but only in requiring a stronger team, without any more trouble to the holders: as the broad wheels only need, that the men should keep the ploughs level, and thereby cut the ground like good ploughmen.

And, in order to promote agriculture, I further beg leave to acquaint your readers, that among other genteel parts of education, I do, and will continue, to instruct young gentlemen (designed to lead a country life, or to  
have



have the management of land) in the mechanical and geometrical principles of all the implements of husbandry, I have constructed; and which are now in use in many parts of the kingdom: as also of the common ploughs of different counties, &c. And I heartily wish, for the happiness of all our worthy farmers, that such a place of instruction was established in every county of the kingdom.

I am, GENTLEMEN,

York.

Your obedient servant,

J. RANDALL.

#### NUMBER LXIV.

*Description of the biennial, and perennial Weeds, enumerated in Vol. V. p. 305, &c. In a third Letter from P. B. C. on that Subject.*

*To the Editors of the MUSEUM RUSTICUM.*

**V**IPER's Bugloss. The stalks are rough, round, solid, erect, undivided, and marked with black spots; the leaves are very rough, long, narrowing to a point, and placed without any certain order. The large specious flowers, of a beautiful blue colour, grow in long bending spikes. They consist of one petal, divided into five roundish segments, of different size; and resemble a horn in their figure; expanding by degrees, from a narrow beginning. The flower-cup consists of five narrow segments; and contains four rough seeds.

*Melilot* is well known by its trefoil leaves, which are indented; and, as it were, eaten about the edges: and by its long, thin spikes of small, yellow flowers; which are succeeded by short rough pods: containing two seeds.

*Wild Carrot, Bird's-nest, or Bees-nest.* Is very like the cultivated Carrot: of which it is indeed supposed to be only a variety. The wild sort, however, differs in its roots, being small, and sticky. In both sorts, after they

have done flowering, the umbels contract themselves, into the shape of a bird's nest.

*Cow Parsnep, Wild Parsnep, Meadow Parsnep, or Madnep.* This grows three feet high. The stalk is round, furrowed, and hollow. The leaves proceed from a large membrane, or sheath. They grow on long hairy stalks, and are divided and downy. The flowers grow in large umbels, are white; and consist of five irregular petals. Two oval, streaked, compressed seeds, surrounded by a wing, succeed each flower.

*Stinking Hawkweed* may be discovered, by its very strong smell like castor. As it is not a common weed, it is not necessary to be particular in the description of it.

*Musk-Thistle* is known, by its handsome purple nodding heads of flowers: which come out rather sooner than most sorts of Thistle. The smell of them is agreeable.

*Carline-Thistle* is very different from the other Thistles. The hard, woody root, sends up one round purplish stalk, beset with prickly leaves in no order. This is terminated with several flowers, growing in a head. The small ones, composing the whole, are of a dusky purple; and contained in a swelling scaly cup. The inner scales of which are very long, shining, coloured, spreading, and placed in a ring round the flowers. The stalks and heads remain all the year, with very little variation, upon the dry pastures.

#### *Perennial Weeds in Corn.*

*Field Fox-tail, Small bastard Fox-tail, or Mouse-tail Grass,* is known by its long, round, slender, smooth spike, of a dusky purple colour. The spikes are so very long, and slender, that they usually bend a little. This grass is found in the moist furrows of arable land; and in any places, where the water is suffered to stand.

*Common Wheat-grass, or Couch-grass,* is universally known, by its long white creeping roots. It grows very tall, especially in hedges. The spike resembles that of wheat, in the manner in which the seeds are disposed.

*Common*



*Common field Scabious*, is all over rough, and hairy. The stalk is upright; a foot, or a foot and a half in height, spotted, and branching. The lower leaves are oval, and indented about the edge. Those, which grow on the stalk, are divided; and of that sort, which botanists call pinnatifid. The flowers are blue; of the compound kind; consisting of a considerable number of small flowers: each divided into four parts; and having one seed under them. The taste of the plant is a disagreeable bitter.

*Small Bindweed*, called, also, *With-wind* and *Hedge-bells*: though these names should seem rather to belong to the great Bindweed; which ramps in the hedges; whereas this overspreads the arable lands. The common people, in their wrath, have given this pernicious weed the same opprobrious names with the Dodder, viz. *Hell-weed*, and *Devil's guts*.

The stalks of this plant are weak; and twine about any thing. They come near, from left to right: and, when they find no support, they trail along the ground. The leaves come out single. They are three cornered, shaped somewhat like an arrow head, smooth, and placed on long foot-stalks. From the bosoms of the leaves, comes out one flower, on a very long foot-stalk. It is bell-shaped, of a beautiful colour, purple, red, white, or variegated: and is succeeded by a small, roundish seed-vessel, containing four large, angular seeds. The whole plant is full of a milky juice.

*Bladder-campion*, *White-corn Champion*, *Spattling Poppy*, *White Bottle*, *White Ben*, or *Frothy Poppy*. The stalks grow a foot and a half, or two feet high, round, smooth, jointed, branched towards the top; and, at every joint, is a pair of leaves, perfectly smooth. The flowers are white; and consist of five bifid petals. The empalement, or outward covering, is puffed out into a roundish form; and is smooth, often varied with red, green, and white, and beautifully veined all over like a fine net.

*White Champion*, admitted into gardens, when it has a double flower, under the name of *White Batchelor's-but-*

tons. It has a long and large root, of a sharp bitterish taste, sending forth several stalks about two feet high; round, hairy, jointed, branching, of a red colour near the ground; a pair of leaves comes out at every joint, hairy, and sharp-pointed. The flowers are like those of the last: but the empalement, which is not puffed out like that, is oblong, with purplish streaks down along it from top to bottom.—The flowers of this are imperfect: the male or barren, and the female or fruitful, growing on distinct plants.

*Small Bramble, or Dewberry-bush*, is distinguished from the common Bramble of the hedges, by the place of its growth; the trailing of its round branches; the smallness of its prickles, which are fewer in number, and chiefly on the stalks; the leaves growing only three together, being green underneath, and the side ones divided into two parts; and the blueness of its berries, which consist of a very few large divisions.

*Corn-mint*. We are told, on undoubted authority, that this herb will hinder milk from curdling: and that, when hungry cows have been put after harvest into a field, where this plant abounded, it has been scarcely possible to turn their milk for cheese.

*Corn Rest-barrow, Rest-plough, Cammock, Petty Whin, or Ground Furze*. The hard, stubborn, creeping roots send forth many woody, round, slender, hairy branches; red towards the bottom. The leaves grow three together. The flowers are of the pea kind, of a beautiful red colour; and are succeeded by a swelling, villous pod; containing a few roundish seeds.

*Tree Southistle*. The root is very creeping, full of milk, and with difficulty eradicated. The stalk is about two feet high, smooth at the bottom, but hairy where it begins to branch out. The leaves are like those of the Dandelion, deeply cut, ending in sharp points, and having the edges set round with tender prickles. The flowers grow several together; and resemble those of the Sow-thistle: but are much larger; of a deeper yellow; and surrounded by a very rough, hairy, dark-coloured empalement.



ment. They have the smell of bitter almonds; and are succeeded by downy seeds.

*Great Knapweed, Matfellow, or Bulweed.* This plant is about two feet high. The stalks are round, streaked, and hoary. The bottom leaves are oblong and undivided: but those, which grow on the stalk, are cut and divided. The flowers resemble those of the Blue-bottles in shape; but are of a red colour. The seed is small, oblong, reddish, and hairy in the upper part.

*Corn Horse-tail* grows in moist places. In April, naked stalks come up, which bear the flower and seed. These are but of short duration. In May, other stalks arise, hollow, jointed, about a foot high; and sending forth, all round, hollow jointed leaves, six or eight inches in length, subdividing into others at the joints.

*Perennial Weeds in Pastures.*

*Devil's-bit* is a kind of scabious. It differs from the common field scabious, in having undivided leaves, set thicker on the stalk: in the flowers not spreading out into a flat surface, but growing in a round form; and the small flowers, which compose the whole, being all of a size and regular: and, lastly, in the root looking, as if it were bit off at the end.

*Great Plantain, or Waybread,* is easily known by its broad leaves, spreading on the ground, and marked on the under surface with seven strong nerves. From the centre of these, arise several naked, round, hairy stalks; sustaining a long, cylindrical spike of small flowers, set thick together.

*Rib-wort Plantain* has much longer leaves, marked only with five nerves. The stalks are higher, and not round; but cornered: and the spikes of flowers are shorter.

*Yellow Ladies Bedstraw, Cheesereneing, Maid's hair, Petty Mugwet.* Its slender stalks rise to about a foot. The leaves come out in whorls, eight or nine together. They are long, and narrow; and of a deep green. Towards the top of the stalk, two little branches usually come out; sustaining

sustaining a considerable number of small yellow flowers; consisting of one petal, divided into four parts; and succeeded by two smooth roundish seeds.

*Round-leaved Bell-flower.* The bottom leaves are roundish: those upon the stalk long, and narrow. The flowers are blue, bell-shaped, with the edge divided into five parts, and hang down.

*Lesser Throatwort, or Canterbury Bells.* The stalk is cornered and undivided, about a foot high, and hairy. The flowers grow at the top of the stalk, close to it; several together. They are erect, of a beautiful purple colour, and divided to the middle into five acute segments.

*Meadow Saxifrage, English Saxifrage, or Stone-break.* The root has a sharpish, aromatic taste. The stalks are round, streaked, and reddish towards the bottom. The leaves are smooth, of a dark green, and divided twice into long, narrow, sharp segments. The foot-stalks membranaceous at the base. The flowers grow in loose umbels: and are of a pale yellow. The seeds are oval, streaked, and red at the top.

*Burnet Saxifrage* is of two kinds. The larger is found in woods; and the smaller, in dry pastures. Of this last, there is a variety, differing only in the leaves, which are cut even to the root. The stalks are streaked, and branching. The flowers grow in umbels, close together. They are small, white, and consist of five entire petals. These are succeeded by two seeds, of an oblong oval form. The root has a very hot taste.

*Crow Garlick, or Wild Garlick.* The leaves are round, and smooth; resembling much those of rushes. From the midst of these rises a stalk, a foot or more in height, naked, slender, round, smooth, and hard; sustaining many purple seeds, or little bulbs, about the size of grains of wheat, collected into a round head.

*White Saxifrage, Sengreen, or Stone-break,* has kidney-shaped leaves, spread upon the ground, and divided about the edges, not much unlike those of Ground-ivy, but softer and smaller; and of a faint yellowish green. Among these,



these, rises a round, hairy, branching stalk, about six inches high, bearing spacious white flowers; consisting of five entire petals. This pretty little plant, grows in dry pastures; and may readily be known by its roots, which are made up of little knobs.

From a want of sufficient distinction in names, a strange confusion has arisen between the Meadow Saxifrage, Burnet Saxifrage, Burnet, and White Saxifrage. It is hoped these descriptions, and figures, will contribute something towards avoiding this confusion for the future.

*Agrimony* has generally a single, round, rough stalk, with leaves placed alternately upon it; which are winged with small leaves, placed between the larger pairs. The yellow flowers grow alternately along the stalk, in a long row, after the manner of a spike; and are succeeded by rough seeds.

*Dropwort* is known by its winged leaves; the divisions of which are all regular, and sharply indented about the edges, by its white flowers; growing in a bunch like an umbel: but, principally, by its roots, which consist of a bunch of knobs hanging upon threads; from whence it has the names of *Filipendula*, and *Dropwort*. The flowers smell agreeably.

*Meadow-sweet*, or *Queen of the Meadows*. The stalk is angular, smooth, strong, branching, and of a reddish colour. The leaves grow alternately, are winged, and consist of three or four pair of lobes, and a very large one at the end, divided into three parts, like a Raspberry-leaf. They are indented about the edges; white underneath; and wrinkled, like the leaf of the Elm. The flowers are similar to those of the *Dropwort*. The whole plant has an agreeable smell.

*Tormentil*, or *Septfoil*. The root is large, of a reddish colour, and an astringent taste. The stalks are weak, and lye on the ground at first; but afterwards rise up. The leaves are hairy; grow close to the stalk; and are divided into seven parts. The flowers are yellow; and consist of four petals. There is another species, not so common, differing

differing from this only in having its stalks lying intirely on the ground ; and the leaves growing on foot-stalks.

The *Crowfoots* are too common every where, to need a description. They are known under the names of King-kob, King-cup, Gold-cups, Gold-knobs, Butter-cups, and Butter-flowers. The bulbose Crowfoot is distinguished, not only by its round root, but by the divisions of the flower-cups being bent back ; the stalk being erect ; and that which sustains the flowers being furrowed. The upright Crowfoot has the divisions of the empalement spreading out, as in the creeping sort : but the flower-stalks are not furrowed, as in that, and the bulbose one. The leaves are divided, first, into three parts ; and each of those again into several. The upper leaves are long, narrow, and undivided. This plant grows much taller than the others. The flowers of all three are alike ; and of a fine shining yellow.

*Pilewort, Figwort, or Lesser Celandine.* The root consists of oblong knobs. The leaves are heart-shaped, cornered, and placed on foot-stalks. The flowers resemble in general those of the Crowfoots ; but differs somewhat from them, in having the cup divided only into three parts : the petals being about eight in number, and narrower. This low plant runs very much at the root, and choaks all plants which are near it.

*Bugle, Middle Confound, Sicklewort, or Herb Carpenter.* It rises about half a foot high, with a square stalk. The leaves come out by pairs ; of a purplish colour ; and indented about the edges. The flowers grow in a spike ; are blue ; and have a very small upper lip.

*Self-heal, Hook-heal, Sicklewort, Carpenter's herb, or Prunell.* This differs from Bugle, in the leaves being longer and narrower : and in the flowers growing in a thicker spike ; their upper lip being larger, and their filaments being forked.

*Common yellow Toad-flax, or Flax-weed.* It creeps very much with its hard woody roots : which send up several smooth stalks, a foot, or a foot and a half high, covered



with long, narrow leaves, placed without order. The flowers grow in close spikes, on short foot-stalks, at the top of the stalks. They are of a light yellow, shaped like a calf's mouth; and end in a spur behind.

*Ladies-smock, Cuckow-flower*; in Norfolk, *Canterbury-bells*. The stalk is upright, round, and smooth. The leaves are winged, with the lobes of the lower ones roundish; and of those upon the stalk oblong. The flowers are large, handsome, and white, or purplish; consisting of four obtuse veined petals. The seeds are contained in erect, compressed pods, an inch, or an inch and a half long; divided into two cells; which, when ripe, burst with a touch; and throw out their seeds to a considerable distance.

*Crow-foot Crane's-bill, or Blue Crane's-bill*. The leaves are divided, almost to the middle, usually into seven parts. The stalk commonly divides into two branches; and each of these into two more. From the corner of each division, comes a flower-stalk; supporting two large blue flowers; consisting of five roundish, intire petals; succeeded by a long seed-vessel, resembling a crane's-bill. This bill-like seed-vessel is thick and rough; but not so long, as in some of the other sorts.

*Rest-harrow, or Cammock*, of the pastures, differs very little from the Corn Rest-harrow described before. The branches of this are armed with long stiff prickles. The flowers are of a higher purple; and come out single: whereas, in the other, they come out two together.

*Dandelion, or Piss-a-bed*, is well known in all pastures, by its milkiness; and its naked, hollow stalks, supporting one large, yellow, compound flower; which is succeeded by a round ball of downy seeds.

*Rough Dandelion, or Dandelion Hawkweed*. The whole plant is rough, with forked hairs. The flower-cup does not bend back, as in the common Dandelion: and this is a taller plant.

*Yellow Devil's-bit*; so called, because the end of the root seems as if it were bit off, is also known by the name

of small Hare's Hawkweed. The leaves are smooth, long, narrow, and cut into long, sharp-pointed segments. The stalks are a foot and a half, or two feet high; and branching. On the tops of these, grow many flowers, smaller and paler than in the Dandelion; supported on scaly flower-stalks.

*Long-rooted Hawkweed.* This has a very long tap root. The stalks are a foot and a half high, or more; cornered; naked, and divided. The bottom leaves spread in a circle on the ground; and are jagged and rough. The flower-stalks are scaly. The flowers, and down of the seed, resemble those of the Dandelion.

*Dwarf, or Small purple Carline Thistle.* This lowly plant spreads its prickly leaves a foot round; and suffers nothing to grow beneath them. Its purple flower comes out in the midst of these, without any stalk, close to the ground.

*Colt's-foot, Folefoot, Horse-hoof, or Bull-foot.* In February, the scaly stalks arise, bearing one yellow compound flower; which is succeeded by a hairy white down. The leaves come out later. They are shaped somewhat like a horse's hoof; and are downy underneath.

*Butter-bur, or Pestilent-wort,* resembles Colt's-foot in many respects: but the flowers are purple, and grow in a thyrse. The leaves come out after the flowers decay; and are like those of the Colt's-foot in shape; but are three or four times as big.

*Ragwort, Ragweed, Staggerwort, Stanerwort, St. James's wort, Seggrum, or Seagrim.* The stalk is usually single; round; streaked; solid; and of a purplish colour, in some parts. The leaves are very much jagged, smooth, and of a dark green. The flowers are yellow, radiated, and grow many together. See Vol. V. p. 117, &c. When I affirmed, that this plant comes up easily by hand, when young, or the ground is moist; I spoke from experience. The fact, in few words, was this. Some closes were notoriously over-run with this weed. The owner, just before the time of flowering, and after some rain, turned in a man and woman upon them; ordering the woman, to pull



pull up all she could by hand ; and the man, to root out the rest, with his docking-iron. The Rag-wort was not, indeed, left in a lane, for the downy seeds to ripen ; and to be carried on again to the closes, by the wind : but the plant was thrown in heaps ; and burnt ; and the ashes were spread upon the grass. It was not, indeed, all destroyed at this first attempt ; but the few plants, which came up, the following year, were soon pulled up by the woman ; and scarce a plant has now appeared in these closes, for several years past.

*Fleabane, Middle Fleabane, or Fleawort.* The stalk is round, bending, solid, and hoary. The leaves are oblong, sharp-pointed, wrinkled, downy, and embrace the stalk, on which they grow, very thick, without regularity. The flowers are yellow, radiated, and inclosed in a flower-cup, made up of narrow scales like bristles. Mr. Ray tells us, that, if the leaves or tops of Fleabane be squeezed, they smell like soap. Gerard says, the herb-women call it Herb Christopher.

*Greater Daisie, Ox-eye, or Maudlin-wort.* The stalk is five-cornered, solid, and branching. The leaves are jagged ; and embrace the stalk. The flowers are large, and radiated. The ray is white ; and the disk yellow : the seeds have no down.

*Common Yarrow, Milfoil, or Nosebleed.* The stalks are slender, round, streaked, stiff, and hairy. They are divided towards the top into several branches ; and these again into flower-stalks ; supporting small white or purplish flowers ; growing thick together in a kind of umbel. The leaves are cut very fine ; and divide twice.

*Common, or Black Knapweed, Matfellow, Black Matfellow, or Bulweed.* The root is hard, thick, and woody ; and has a disagreeable astringency. The stalks are round, rough, streaked, strong, and very tough. The leaves are irregularly placed, oblong, and of a dark green. From the wings of the leaves, arise stalks, supporting one, two, or three heads of flowers ; which are purple ; and inclosed in a scaly cup. The scales are black, and surrounded with fine hairs, like the eye-lashes.

The *Orchises* may be known by their roots; which are either a double bulb, resembling a pair of testicles; or a bunch of long fleshy roots, like the fingers of the hand. The flowers, by growing in a spike, make a handsome appearance. The colour is red in most sorts.

*Adder's-tongue*, is hid among the grass in low meadows. From a very low stalk, arises a single, thick, smooth, oblong leaf; from the bosom of which, issues a kind of tongue, ending in a point, and indented on each side like a file.

Thus have I finished my intended descriptions. If I can be of any farther service in this business; or any other relative to agriculture; I shall, at any time, readily employ a vacant hour in so good a work. Give me leave to remark, in answer to Mr. Comber, that when I put Heart-trefoil among weeds, I did not mean, that it was an useless plant; but that, in my opinion, it was inferior to the other kinds of Trefoils. It will not be thought, I hope, that all the plants, which are inserted in my list, are absolutely useless, and injurious; but that they are so, only because they are out of their place, or occupy the room of better things. If I send you, as I intend to do, when I have leisure, an account of our English plants, which are most useful in the various purposes of life, you will find many of those, which have before appeared in the list of weeds, come forth again in a more reputable form.

You have, with this packet, a specimen of the *Strawerry Trefoil*; which you may make what use of you think best. It is a plant, that propagates itself very fast in its natural state, by its creeping stalks, which take root at every joint. The leaves come out from a large bifid membrane. They are small, and placed on a long, hairy foot-stalk; and slightly indented round the edge. The round heads of flowers come out single, on a long stalk, from the membranes; and consist of small, pale red flowers. When these decay, the flower-cups swell out into rough bladders; which bend down, and are divided into two horns,



horns, at the end; each bladder has within it, a small pod, containing one seed. It flowers late, in July or August, and is common in pastures where the water has stagnated during the winter.

I cannot subscribe to the opinion of *Ruricola Glocestris*, concerning the fatal effects of Ground-ivy upon horses. This herb has been used, time out of mind, for a variety of disorders, incident to the human body: and, in many, with very good success. As, therefore, I can find no ill qualities attributed to it, by any writer; nor any internal marks in the plant itself, to persuade me, that it is at all noxious, I must suppose, the death of the horses to be owing to some other cause, till more convincing proof be brought. It is, however, an useful caution; and, I hope, will be farther attended to: as fact will ever be better than reasoning.

The Orchar-d-grass, mentioned by *Civicius*, Vol. V. p. 45. is the *Dactylis Glomeratus*, of Linnæus, Rough Cock's-foot Grass, or Rough Grass. It is a tall, and very coarse grass. The stalk and leaves very rough, and the head thick, heavy, and growing wholly on one side of the stalk: but it is well represented in Plate I. Fig. 5.—There is a variety of this, not unfrequent about London; which is less harsh, with narrower and smoother leaves; and the spike at the top longer, and more slender. Perhaps, this may be the grass which *Civicius* recommends.

In answer to Mr. *Comber's* question, Vol. V. page 63, whether the *wild* Saintfoin differs from the *cultivated*; I answer, not at all, unless in being smaller. Old Gerard takes notice of its growing wild about Cambridge; and upon Barton-hill in Bedfordshire. It is very common in England on balks; and particularly in chalky pastures: and is, by no means, a starved plant with us, in its wild state.

# INDEX to VOLUME VI.

## A

- A** CORNS, premium for 339  
 Adder's-tongue, description of 452  
 Agricola, letter from, on the nature, use, and culture of the turnep-cabbage 46  
 On the practicability of producing silk in England 89, 241  
 On a newly-discovered method of killing insects 199  
 On cultivating flax, &c. 429  
 Agrimony, description of 447  
 Aloes, premium for 364  
 Annual daniel-grass, description of 196  
 Ants, or pismires, injury done to grass-land by 316  
 Method of destroying *ib.*  
 Ash, pearl, premium for 360  
 Pot, process for making 58

## B

- B** ALDWIN, Christopher, extract of a letter from, to Dr. Templeman, on the culture of burnet 259  
 Barilla, premium for 364  
 Barley, premium for cultivating 347  
 Basso relieve, in clay, premium for 354  
 In marble 356  
 Bastard alkanet, description of 196  
 Battery, what, and how performed in making indigo 391  
 Beans, premium for cultivating 347  
 Bearded oat-grass, or wild oats, description of 196  
 Bed-straw, yellow, ladies, description of 445  
 Beer, small, directions for making a cheap and wholesome kind of 187  
 Bees, premium for preserving the lives of 349  
 Bell-flower, round-leaved, description of 446  
 Ben, white. See Campien.

- Bent grass, premium for gathering the seeds of 345  
 Biennial weeds. See Weeds.  
 Bindweed, black, description of 198  
 Small *ib.*  
 Bird grass, letter to the society on the subject of 120  
 Nature, culture, and uses of *ib.*  
 Birds-nest, or Bees-nest. See Wild Carrot.  
 Boorcole, premium for sowing 350  
 Borax, premium for a substitute for 351  
 Bramble, small, description of 444  
 British American Colonies, premiums for the advantage of 300  
 Bronzes, premium for 356  
 Bugle, description of 448  
 Bugloss, viper's, description of 441  
 Bull, particulars of the remarkable weight of 220  
 Bull-weed. See Great Knapweed.  
 Bull's-foot. See Colt's-foot.  
 Bundles of hay to be carried to cattle, improved method of making 39  
 Plate of *ib.*  
 Burnet, its use in feeding cattle and sheep 28, 261  
 Will rarely make a mowing crop the first year 30  
 A peculiar flavour given to milk by cows feeding on 29  
 Different cattle eat 29, 31, 38, 275  
 ———— dislike 276  
 Not to be compared in value with common clover 158  
 State of a piece of ground cultivated with 240  
 Observations on the culture of 259  
 Premium for sowing 344  
 Saxifrage. See Saxifrage.  
 Butter-bur, description of 450

## C

- C** ABBAGE-Turnep. See Turnep-Cabbage.  
 Caldrons, two kinds of, necessary for the making of pot-ash 59  
 Cammock.



# I N D E X.

Cammock. See Rest-harrow.  
 Campion, bladder, description of 443  
     White-corn *ib.*  
     White *ib.*  
 Canterbury-bells. See Throatwort.  
 Carolina poplar, observations on 291  
 Carriages, premium for improvements  
     in wheel 359  
 Carrots, premium for sowing 343  
     Cultivating 347  
     Wild, description of *ib.*  
 Cattle, observations on the grazing or  
     feeding 312  
 Celandine, lesser. See Pilewort.  
 Charlock, description of 198  
 Cheese-rening. See Bedstraw.  
 Chestnuts, premium for planting 340  
 Cinnamon, premium for 364  
 Claims to be made for premiums 369  
 Clay, basso relievo in, premium for  
     Models in *ib.* 354  
 Cloth, broad, premium for 357  
 Coals, observation on a common error  
     or collusion, practised with regard  
     to the form of measures for 264  
 Cobalt, in America, premium for 366  
 Cochineal, premium for 360  
 Cole-seed, inquiries relative to 271  
 Colt's-foot, description of 450  
 Comber, the Rev. Mr. letter from, on  
     a peculiar method of tillage, &c. 88  
     On inclosing of commons, and in-  
     grossing of farms 130  
     On completing a catalogue of  
     English weeds 166, 276  
 Commercialis, letter from 179  
 Commons, reflections on inclosing  
     130, 133  
 Confound, middle. See Bugle.  
 Copper, indigo, how made 391  
 Corn, expedience of continuing the  
     bounty on 16  
     Further considerations on 212, 419  
     Quantity exported in ten years of 13  
     Table, shewing the price at Wind-  
     for-market for 169 years, of 21  
     Advantages of selling by weight in-  
     stead of measure 160  
     A method proposed to encourage the  
     exportation of, in lieu of the  
     bounty on 233  
     Inquiry relative to Dr. Hales's ma-  
     chine for winnowing 255  
     Observations on a common error, or  
     collusion, practised with respect  
     to the form of measures for 264

Corn-crowfoot, description of 193  
 Cotton, how cultivated in China 394  
 County-societies for the encourage-  
     ment of agriculture, advantages  
     that might accrue from the esta-  
     blishment of 229  
 Cow parsnep, description of 442  
 Crane, proposal for applying, to carry  
     up materials for buildings 377  
 Crane's-bill, blue, description of 449  
 Crockatt, Mr. a letter from to Mr.  
     Comber, and an answer from Mr.  
     Comber to him 8  
 Crow-foot crane's-bill, description of  
     449  
 Cuckow-flower. See Ladies-smock.  
 Cutting-box, proposed improvements  
     on 14  
     Description and plate of 10

## D

**D** AISIE, greater, description of 451  
 Dandelion, description of 449  
     Rough *ib.*  
     Hawkweed *ib.*  
 Devil's-bit, description of 450  
     Yellow *ib.*  
 Dew-berry bush. See Bramble.  
 Dodder, description of 197  
 Dog's-tail, grass, crested, premium for  
     gathering the seed of 345  
 Dossie, Mr. letters from, on the mak-  
     ing of pot-ash 57, 295  
 Draining lands, observations on the  
     advantages of 151  
     Premium for a machine for 349  
 Drawings, premiums for, at the aca-  
     demy, St. Martin's-Lane 351  
     From the duke of Richmond's gal-  
     lery 352  
     Of a human figure *ib.*  
     Beasts, birds, &c. *ib.*  
     Of fruit, flowers, &c. *ib.*  
     Patterns for weavers 358  
     Of landscapes *ib.*  
     Honorary *ib.*  
 Drill culture, observations on 227  
     And common husbandry, compara-  
     tive calculation of expence and  
     profit between 280, 319  
 Dropwort, description of 447  
 Dutch willow 379  
 Dwarf oak, a kind of, recommended  
     to be propagated 293

ELM,

# I N D E X.

## E

- E**LM, premium for planting 340  
 Engraving, landscapes, premiums for 355  
 Intaglios *ib.*  
 Etchings, premiums for, by youths 354  
 By young women 355  
 Ewe, extraordinary weight of wool clipped from off 307

## F

- F**ARMS, reflections on engrossing 130, 133  
 Fescue, grass-meadow, premium for gathering the seeds of 345  
 Sheeps *ib.*  
 Field scabious, common, description of 443  
 Figwort. See Pilewort.  
 Fir-trees, observations on the propagation and culture of Scotch and spruce 41  
 Premium for planting 341  
 Flax, yellow common toad, description of 448  
 Weed *ib.*  
 How cultivated 429  
 Fleabane, description of 451  
 Middle *ib.*  
 Fleawort. See Fleabane.  
 Flora, indigo, how to make the fine 391  
 Folefoot. See Colt's-foot.  
 Foxtail grass, meadow, premium for gathering the seed of 345  
 Field, description of 442  
 Small bastard *ib.*  
 Fufee chains, premium for 358

## G

- G**ARDENS, provincial, premium for 367  
 Garlick, crow, description of 446  
 Wild *ib.*  
 Granaries, public, structure, use, and expence of 404  
 Grass-seeds, gathered by hand, premiums for 345  
 Common wheat. See Wheat-grass-couch *ib.*  
 Grasses, different kinds of, recommended to be sown on a wet soil 34  
 Observations on the distinct culture of 125

Ground-ivy, examination of the proofs advanced to shew the fatality of, when eaten by horses 86  
 Furze. See Restharrow.

## H

- H**AWKWEED, stinking, description of 449  
 Long-rooted 450  
 Haw-thorn, a kind of, recommended to be propagated 292  
 Heart-clover, observations on 168  
 Hemlock, lesser, description of 197  
 Hemp, enquiry relative to 381  
 Herb-carpenter. See Bugle, Self-heal.  
 Hertfordshire-willow 81  
 Hewitt, the Rev. Mr. letter from, on his invented horse-hoe 397  
 Hogs, a speedy method of fattening 116  
 Experiment made on, by the use of sea-water 146  
 Hookheal. See Self-heal.  
 Hopbinds, for making cloth 429  
 Hop-trefoil. See Trefoil.  
 Horse-hoe, a new invented, description of 397  
 Figure of 402  
 Hoof. See Colt's-foot.  
 Horses, how cured of worms 7

## I

- I**NDIGO, manner of cultivating and preparing in Carolina 387  
 In China 391  
 Upland proper for 387  
 Battery for making 391  
 The fine, copper, how made *ib.*  
 The fine purple *ib.*  
 The fine flora *ib.*  
 Mud, what 393  
 Insects, a newly-discovered method of destroying 200  
 Intaglios, premium for engraving 355  
 Iron rod, necessary for the making of pot-ash 59  
 Ladle *ib.*  
 Rake *ib.*  
 Chisel *ib.*  
 Premium for, from black sand 360  
 Italian, or Lombardy poplar, nature, propagation, and uses of 175

KEN-



# I N D E X.

## K

- K**ENTISHMAN (the) letter from,  
on whether the culture of burnet  
be advantageous 159  
On burnet 240  
Knapweed, great, description of 445  
Black 451  
Knot-grafs, description of 198

## L

- L**ADIES SMOCK, description of 449  
Lands, observations on the advantages  
of draining marshy and moory 151  
Grass, injury done to, by ants, or  
pismires 316  
Premium for a machine for drain-  
ing 349  
Improved by trench-ploughing 12  
Landscapes, premium for engraving 355  
For painting 356  
Lombardy poplar. See Italian poplar.  
Lucern, comparative advantages of  
cultivating in the drill, or broad-  
cast methods 170  
Premium for sowing or planting 342  
Cultivating 347  
Cultivation of, in Picardy 385  
Lye, in the making of pot-ash, a re-  
ceiver for 58  
Vats for containing and keeping the  
strong and weak 59  
Pair of scales, with two vials, for  
determining the strength of *ib.*

## M

- M**ACHINE, for winnowing corn,  
inquiry relative to Dr. Hales's 255  
Premium for extracting water out  
of ships 359  
For slicing turneps, premium for 56  
Queries relating to 114  
Remarks on 163, 221  
Madder, premium for planting 347  
Wild 349  
Madnep. See Cow-parfneep.  
Mago, letter from, on burnet 26  
In answer to Mechanicus's queries. 103  
On improving public roads 108  
Maid's hair. See Bedftraw.  
Manufacturer (a) letter from 212  
VOL. VI. No. 33.

Manufactures, premiums for impro-  
ving 357

Marble statues, premium for 356  
Basio relievo's *ib.*

Market-weighton, particular manage-  
ment of some land by the people  
of 84

Marle, observations on the nature of 214

Matfellow. See Knapweed. Black, *ib.*

Maudlin-wort. See Daisie.

Meadow fefque-grafs, premium for ga-  
thering the seed of 345

Foxtail *ib.*

Meadow-sweet, description of 447

Mechanics, premium for improve-  
ments in 359

Mechanicus, letter from 35

On a machine for slicing turneps, and  
a new method of making hogs fat 114

Relating to Mago's instruction for the  
management of his farm 214

Giving an account of the straw-  
berry, or hop-trefoil 302

On hemp 381

Melasses, directions for making a  
cheap and wholesome extempo-  
raneous small-beer from 187

Melilot, description of 441

Metzotintos, premiums for, by young  
men 355

By young women *ib.*

Milfoil. See Yarrow.

Millet, enquiries relative to 269

Mitts, knitting, premium for 358

Models, premium for, in clay 354  
In wax *ib.*

Moufetail-grafs. See Field foxtail-  
grafs.

Mud, indigo, what 393

Mugwort. See Bedftraw.

## N

**N**ETTLE stalks for making cloth 429

Nitre in America, premium for 369

Nonfuch. See Hop-trefoil

Norfolk-willow, found growing, di-  
rections for propagating 77

Observations on 379

Nose-bleed. See Yarrow.

## O

**O**AT-grafs, bearded, or wild oats,  
description of 196

Oats, premium for cultivating 347

O o o Oil-

# I N D E X.

Oil-cakes, account of feeding horned cattle with 313  
 Orchises, description of 452  
 Ornaments in wax, premium for 354  
 Ox-eye. See Daisie.

## P

**P**ARSLEY, premium for sowing 343  
 Cultivating 347  
 Parsneps, cow, wild, meadow, descriptions of 442  
 ——— premium for cultivating 347  
 Pearl-ash, premium for 360  
 Peas, premium for cultivating 347  
 Peat-ashes, a good dressing for spring corn or grass land 155  
 Observations on 308  
 Manner of preparing and using *ib.*  
 Perennial weeds. See Weeds.  
 Philomath, letter from, in answer to Mechanicus's queries 33  
 Philoſylva, letter from, on the advantages of planting quick-growing trees 73, 287  
 Pilewort, description of 448  
 Pis-a-bed. See Dandelion.  
 Piſmires. See Ants.  
 Plantain, great, description of 445  
 Rib-wort *ib.*  
 Stem of good to make cordage or 429  
 Planting and husbandry, premiums for 339  
 Plough lifting 439  
 Loosening for the turning up of soil *ib.*  
 Trench *ib.*  
 Of a new construction, described 235  
 Account of the uses of 423  
 Ploughs, hints for the improvement of 129  
 Poa, or Suffolk-grass, hints on 128  
 Common, premium for gathering the seeds of 345  
 Annual *ib.*  
 Polite arts, premiums for 351  
 Poppy, spatling. See Campion.  
 Frothy *ib.*  
 Pot-ash, Mr. Doſſie's process for making 68  
 Utensils proper for *ib.*  
 What 65  
 Further instructions for making 295  
 How to distinguish the goodness of 360  
 Potatoe bread, how made 376

Premiums, list of, offered by the Society of arts, &c. 339  
 Provincial gardens, premium for 367  
 Prunell. See Self-heal.  
 Purple indigo, how made 391

## Q

**Q**UICKSILVER, means of destroying insects with 200  
 Dissolved, destroys almost all kind of small animals 203  
 May be absorbed by plants *ib.*  
 An extraordinary fact respecting, related by Governor Thicknesse 264  
 Produced by vegetables, an account of 305

## R

**R**AGWEED. See Ragwort.  
 Ragwort, description of 450  
 Randall, Mr. letter from, on the structure and use of the spiky roller 371  
 On the improvement of soil 438  
 Rape-seed, enquiries relative to 271  
 Red, eyebright 199  
 Rest harrow, corn, description of 444  
 Plough *ib.*  
 Roads, public, means of improving 108  
 Parish, proposed improvement for 109  
 Rocque, Mr. Barth. letter from, to the Society of arts, &c. on Bird-grass 119  
 Rum, directions for improving the British imitation of 189  
 Ruricola Glocestria, letter from, on the culture of Teasel 1  
 On the importance of planting quick-growing trees 376  
 Rye, premium for cultivating 347

## S

**S**AINSTFOIN, premium for cultivating 347  
 St. James's-wort. See Rag-wort.  
 Sal Ammoniac, premium for making 351  
 Salt useful in feeding hogs 116  
 Saxifrage meadow, description of 446  
 English *ib.*  
 Burnet *ib.*  
 White *ib.*  
 Scales, a pair of common, necessary for the determining the strength of the lye in the making of pot-ash 139  
 Scammony, premium for 360  
 Scotch



# I N D E X.

Scotch and spruce firs, observations on the propagation and culture of 41  
 Respective heights and circumference of 48  
 Seagrim, observations on 167  
 Seagrim. See Rag-wort.  
 Seggrum. See Rag-wort.  
 Self-heal, description of 448  
 Sengreen. See Saxifrage.  
 Septfoil. See Tormentil.  
 Sheeps fescue-grass, premium for gathering the seeds 345  
 Shepherd's-needle, or Venus's-comb, description of 197  
 Sicklewort. See Bugle and Self-heal.  
 Silk in England, practicability of producing 89, 241  
 Present state of labour too high for 94  
 Knowledge necessary for 97  
 Proposal for attempting the production of 304  
 Premium for dying in grain 351  
 Cocoons, premium for 365  
 Raw *ib.*  
 Worms, whether the climate of this country will agree sufficiently well with 92  
 Whether the proper food can be provided here for 93  
 Small corn-parsley, description of 197  
 Societies, county, for promoting agriculture, advantages that might accrue from the establishment of 229  
 A proposal for establishing a correspondence between 268  
 Soil, observations on the effects of frequently repeated stirrings of 235  
 Instantaneous improvements of 444  
 Sowthistle-tree, description of *ib.*  
 Spiky roller, structure and use of 372  
 St. James's wort. See Ragwort.  
 Stagger-wort. See Rag-wort.  
 Stanner-wort. See Rag-wort.  
 Statues, in marble, premium for 356  
 Stone-break. See Meadow Saxifrage.  
 Strawberry-trefoil. See Trefoil.  
 Suffolk-grass. See Poa-grass.

## T

**T**ARES, premium for cultivating 347  
 Teasel, culture of 1  
 King's, what 2  
 Middlings, what *ib.*  
 Scrubs, what *ib.*

## S

Expences attending a crop per acre of 3  
 Advantages of a crop of corn amongst 4  
 Tees Vale, account of extraordinary size of neat cattle and sheep in 304  
 Thistle, musk, description of 442  
 Carlina *ib.*  
 Dwarf 430  
 Tree sow 444  
 Thread, manner of making 429  
 Throatwort, lesser, description of 446  
 Tobacco, how cultivated in China 394  
 Tormentil, description of 447  
 Transylvania hasel, observations on 291  
 Trees, advantage of planting quick growing 73, 287, and 376  
 Lopping, detrimental to 377  
 Trefoil, strawberry or hop, account of 302  
 Difference of (see note) 332, 334  
 Nonsuch, or hop, nature, use, and manner of cultivating 382  
 Trench ploughing for the improvement of land  
 Tup, extraordinary weight of 305, 307  
 Lamb, extraordinary weight of wool clipped from off *ib.*  
 Turnep-cabbage, description of 46  
 Two kinds of 48  
 Figures of 49, 50  
 Miller's description of 51  
 North's *ib.*  
 How to be cultivated 52  
 Good for feeding cattle 54  
 Its use at sea recommended *ib.*  
 Premium offered for 67, 350  
 Observations on 223  
 Turneps, machine for slicing, premium for 59, 350  
 Premium for cultivating 347

## V

**V**ATS, for dissolving the salts in the making of pot-ash, description of 58  
 For containing and keeping the strong lye 59  
 Weak lye *ib.*  
 Vernal grass, premium for gathering the seeds of 345  
 Vetches, premium for cultivating 347  
 Vials, two, necessary in the making of pot-ash, for the determining the strength of the lye 50  
 Vines, for ardens, premiums for 302  
 Vines *ib.*  
 Viper's

# I N D E X.

Vigor's bugloss, description of 441  
 Utensils necessary for making pot-ash 58

## W

**W**ATCH fusee-chains, premium for 358  
 Way-bread. See Great Plantain.  
 Weeds, English, remarks on the benefits that would arise from compiling a catalogue of 164  
 Description and plate of annual 195  
 Description of biennial and perennial 441  
 Weymouth pine, premium for planting 342  
 Wheat, premium for cultivating 347  
 Wheel, carriages, premium for improvements in 359  
 Wild carrot, description of 347  
 Willow, Norfolk. See Norfolk willow.  
 Dutch. See Dutch willow.  
 Herefordshire. See Herefordshire Willow.

Wines, directions for preparing domestic 179  
 Observations on the private and public utility of making domestic 179  
 Worms in horses, cure of 7  
 Wynne Baker, Mr. letter from, on premiums offered by the Society of arts, &c. 220  
 Several enquiries, &c. 268  
 His report to the Dublin Society on the comparative calculation of the expence and profit between the drill and common husbandry 280

## Y

**Y**ARN, premium for dying yellow 351  
 Green *ib.*  
 Fine linen 357  
 Yarrow, common, description of 451  
 Yellow rattle, description of 199  
 Vetchling 198  
 Oat grass-seed, premium for gathering 349

## E N D O F V O L. VI.











